3.4 BIOLOGICAL RESOURCES

3.4.1 Introduction

The Salton Sea is located in an area that has a long history of dynamic changes; as a result of these changes, which have occurred over hundreds of thousands of years, the area has periodically provided aquatic habitat. The Salton Basin was once part of the Gulf of California, although it was isolated from the Gulf by sediment deposition from the Colorado River. The Salton Sea is in a basin that was flooded by the Colorado River for thousands of years (Brothers et al. 2009). From 1824 to 1906, Colorado River flows flooded the Salton Sea no fewer than eight times. Each time and countless times before, the Colorado River meandered northwest and filled the Basin with fresh water. Recorded floods include 1840, 1852, 1859, 1867, 1891, 1905, and 1906. The modern Salton Sea formed between 1904 and 1907 when repeated flooding along the Colorado River caused water diverted from the Colorado River for irrigation to break through a diversion headworks. The Sea was initially a freshwater lake, primarily sustained by inflows of agricultural drainwater, but over time it has become more saline than the ocean due to evaporation and lack of outflow. These changes in salinity have had a profound influence on the aquatic communities present. After the Sea formed, migratory birds began to use the Sea, and a number of species became resident. By 1908, fish were reported to be "plentiful–swarming by the hundreds" and the Sea supported nesting populations of herons, cormorants, and white pelicans (Grinnell 1908). Native plant communities in the Salton Sea area were profoundly affected by human activity, such as the conversion of the Imperial and Coachella valleys to agriculture and other uses. These activities not only eliminated vast areas of native vegetation, but also altered substrate and water regimes, and led to the introduction of nonnative plant species that have proliferated and now dominate most of the disturbed areas around the Salton Sea.

Salinity in the Salton Sea is expected to exceed the tolerance of most fish species currently present in the near future, thereby eliminating the food source for piscivorous (fish-eating) birds that use the Sea. How soon that will occur is unknown, but it could be within a few years to a decade or more. The Species Conservation Habitat (SCH) Project is designed to provide replacement for some of the near-term habitat losses that are expected to occur as surface water levels at the Sea decline and salinity increases. The biological resources analysis evaluates the effects of constructing and operating the Project alternatives on terrestrial (plant and animal) and aquatic organisms, including special-status species. Issues to be addressed include:

- Effects of construction as well as operations and maintenance activities on biological resources (special-status as well as common species, riparian and wetland habitats, and common native plant communities and wildlife);
- Potential for disease and toxicity effects (e.g., selenium and botulism);
- Habitat suitability (physical and chemical) for aquatic species;
- Aquatic habitat stability (physical, chemical, and biological) to provide adequate forage for piscivorous birds;
- Suitable habitat for bird resting, roosting, and nesting.

Table 3.4-1 summarizes the impacts of the six Project alternatives on biological resources, compared to both the existing conditions and the No Action Alternative.

Table 3.4-1 Summary of Impacts on Biological Resources

Impact	Basis of Comparison	Project Alternative						Mitigation Measures
		1	2	3	4	5	6	
Impact BIO-1a: Project construction and operation would affect habitat and individuals of desert pupfish and several special-status bird species.	Existing Condition	S	S	S	S	S	S	MM BIO-1: Prepare and implement a desert pupfish protection and relocation plan. MM BIO-2: Prepare and implement a preconstruction/ maintenance survey plan for bird species. MM BIO-3: Conduct noise measurements and implement noise attenuation measures, if needed. MM BIO-4: Design interception ditches to avoid alteration of water levels in adjacent marshes.
	No Action	S	S	S	S	S	S	Same as Existing Condition
Impact BIO-1b: Project construction and operation would have minor effects on habitat and individuals of several special-status bird and mammal species.	Existing Condition	L	L	L	L	L	L	None required
	No Action	L	L	L	L	L	L	None required
Impact BIO-1c: Project operation would provide habitat for desert pupfish and several special-status bird species.	Existing Condition	B	B	B	B	B	B	None required
	No Action	B	B	B	B	B	B	None required
Impact BIO-2: Project construction and operation would cause a temporary disturbance or loss of riparian habitat and/or sensitive habitat.	Existing Condition	S	S	S	S	S	S	MM BIO-5: Prepare and implement a Habitat Protection, Mitigation, and Restoration Program.
	No Action	S	S	S	S	S	S	Same as Existing Condition
Impact BIO-3a: Project construction would result in temporary disturbance of Federal Waters of the U.S. and minimal effects on wetlands.	Existing Condition	L	L	L	L	L	L	MM BIO-4 MM BIO-5
	No Action	L	L	L	L	L	L	Same as Existing Condition
Impact BIO-3b: Project operation would increase the amount of Federal Waters of the U.S.	Existing Condition	B	B	B	B	B	B	None required
	No Action	B	B	B	B	B	B	None required
Impact BIO-4: Project construction and operation would not interfere with	Existing Condition	L	L	L	L	L	L	MM BIO-5

Table 3.4-1 Summary of Impacts on Biological Resources

Impact	Basis of Comparison	Project Alternative						Mitigation Measures
		1	2	3	4	5	6	
movement of fish and wildlife species, but construction could remove snags for colonial nesting birds.	No Action	L	L	L	L	L	L	Same as Existing Condition
Impact BIO-5a: Project construction and operation could affect nesting by some common bird species and introduction of invasive species.	Existing Condition	S	S	S	S	S	S	MM BIO-2 MM BIO-3 MM BIO-6: Clean equipment prior to site delivery.
	No Action	S	S	S	S	S	S	Same as Existing Condition
Impact BIO-5b: Project construction and operation would have minor effects on common fish (native and nonnative), wildlife species, and native plant communities.	Existing Condition	L	L	L	L	L	L	None required
	No Action	L	L	L	L	L	L	None required
Impact BIO-5c: Project construction and operation would benefit common fish (native and nonnative) and wildlife species.	Existing Condition	B	B	B	B	B	B	None required
	No Action	B	B	B	B	B	B	None required

Notes:
O = No Impact
L = Less-than-Significant Impact
S = Significant Impact, but Mitigable to Less than Significant
U = Significant Unavoidable Impact
B = Beneficial Impact
When multiple impact levels occur under one impact, only the highest level is used in the summary (e.g., in many cases S, L, and B occur).

3.4.2 Regulatory Requirements

The regulatory framework for biological resources includes the following Federal, state, and local requirements. Restoration actions at the Salton Sea could be subject to some or all of these requirements.

3.4.2.1 Federal Regulations and Executive Orders

The **Clean Water Act of 1972**, as amended (33 USC section 1251 et seq.) **(**CWA**)** provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters, as described in Chapters 5 and 6. Section 401 of the CWA requires an applicant for a Federal license or permit to obtain a certification from the state that the discharge will comply with applicable effluent limitations and water quality standards for construction and operation of the facility. Section 404 of this act prohibits discharges of dredged or fill materials into waters of the United States except as permitted under separate regulations by the Corps and the U.S. Environmental Protection Agency. This section also provides protection to "special aquatic sites" that include sanctuaries and refuges, wetlands, and mudflats.

The Federal **Endangered Species Act of 1973**, as amended, (16 USC section 1531 et seq.) protects listed threatened or endangered species (and any designated critical habitat) from unauthorized take[1]. It also directs Federal agencies to ensure that their actions do not jeopardize the continued existence of listed species. Section 7 of the act defines Federal agency responsibilities for consultation with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) (the Services), including the preparation of the Federal agency's Biological Assessments and the Services' Biological Opinions. Section 10 of the act describes how the USFWS may authorize take of a listed species by non-Federal agencies, including preparation of Habitat Conservation Plans.

The **Migratory Bird Treaty Act of 1918**, as amended (16 USC section 703-712) provides for the protection of migratory birds by making it illegal to possess, hunt, pursue, or kill any migratory bird, or any transaction pertaining to any wild migratory bird, part, nest, egg or product, manufactured or not, unless specifically authorized by a regulation implemented by the Secretary of the Interior, such as designated seasonal hunting. Executive Order 13186 (2001) directs Federal agencies with actions that have, or are likely to have, a measurable negative effect on migratory bird populations to develop and implement a Memorandum of Understanding with USFWS within 2 years to promote conservation of migratory bird populations relative to the proposed action.

Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) require Federal agencies to provide leadership to protect the natural and beneficial values served by floodplains and wetlands. Federal agencies are directed to avoid development in floodplains where possible, and to minimize the destruction or degradation of wetlands.

3.4.2.2 State Regulations

The **Porter-Cologne Water Quality Control Act** (Porter-Cologne) (California Water Code Title 23) protects California waters, as described in Chapter 6. Porter-Cologne gives the State Water Resources Control Board, through the Regional Water Quality Control Boards, the authority to regulate discharges of waste, including dredged or fill material, to any waters of the state similar to authority of the Corps from the Federal CWA. The Colorado River Basin Regional Water Quality Control Board (CRBRWQCB) has prepared (and amended) a basin-wide Water Quality Control Plan that serves as a guide to optimize the beneficial uses of the water within the Colorado River Basin region of California by preserving and protecting the quality of these waters.

The California Lake and Streambed Alteration Program (Fish and Game Code section 1600 et seq.) requires any person, state, or local government agency, or public utility proposing a project that could divert, obstruct, or change the natural flow of any bed, channel, or bank of a river, stream, or lake to notify the California Department of Fish and Game (DFG) before beginning the project. If DFG determines that the project could adversely affect existing fish and wildlife resources, a Lake or Streambed Alteration Agreement is required.

The California Endangered Species Act of 1984 (Fish and Game Code section 2050 et seq.) provides for the protection and preservation of threatened and endangered plants and animals, and their habitat, and prohibits the taking of such species without DFG's authorization. Section 2081 lists the conditions that must be met in order for DFG to authorize take.

The California Fully Protected Birds, Mammals, Reptiles and Amphibians, and Fish statutes (Fish and Game Code sections 3511, 4700, 5050, and 5515) prohibit the take or possession of any fully

[1] As defined by the Federal Endangered Species Act, "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (16 USC section 1531[18]).

protected bird, mammal, reptile and amphibian, or fish. However, Fish and Game Code section 2081.7 was amended to allow DFG to authorize the take of species resulting from impacts attributable to the implementation of the Quantification Settlement Agreement (QSA) (refer to Section 1 for a discussion of the QSA). Take of fully protected species may be authorized if related to the QSA.

3.4.2.3 Local Regulations

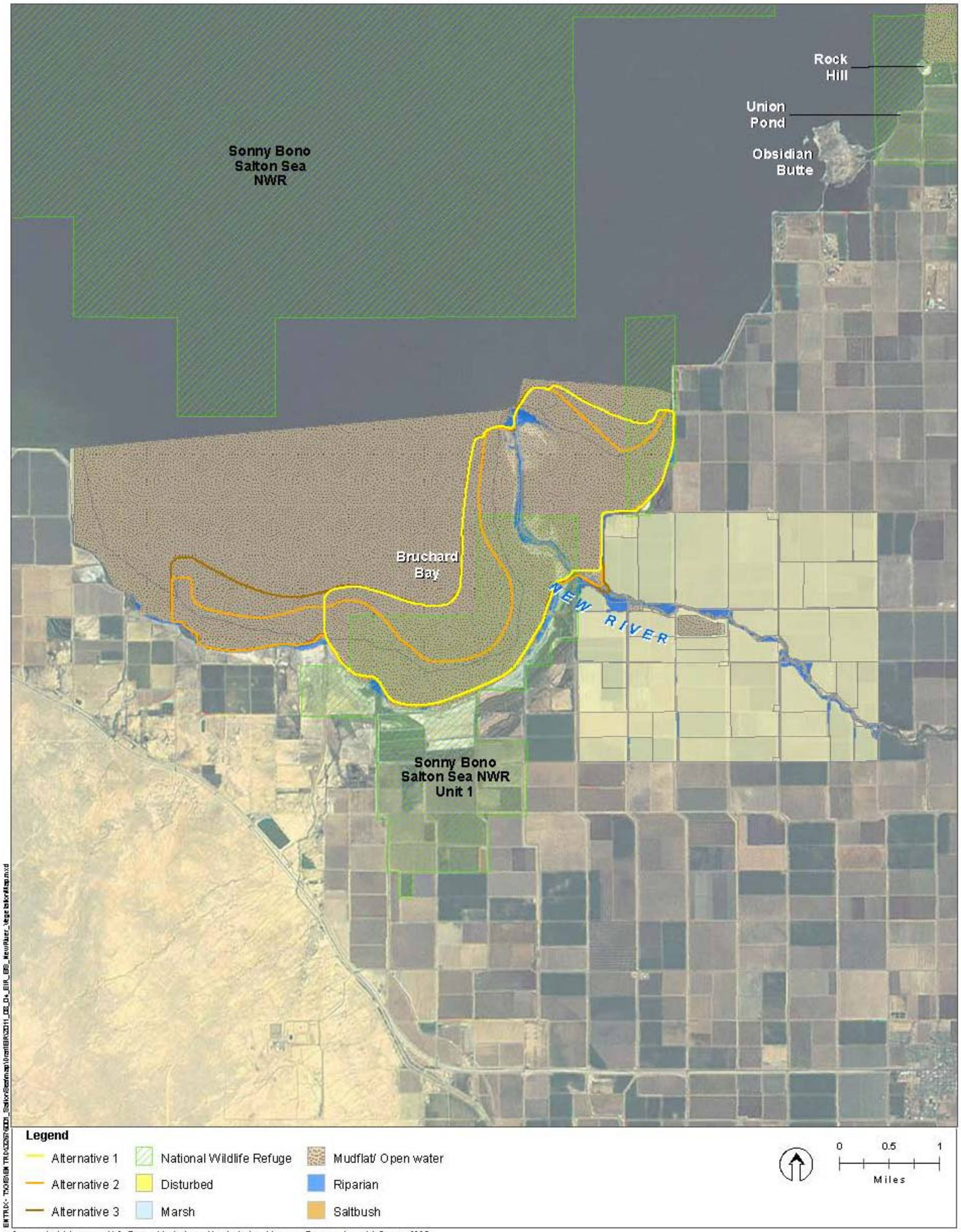
The Imperial County General Plan (2008) contains a number of objectives and policies intended to protect biological resources, including those of the Salton Sea (see Section 3.13, Land Use for details).

3.4.3 Affected Environment

A brief regional description of biological resources is followed by a focused description of the areas that could be affected by the SCH Project. The area of potential effect for biological resources is limited to those areas of the Salton Sea ecosystem that could be affected by the Project, including the Sea's southern portion, the lower reaches of the New and Alamo rivers within approximately 5 miles of their confluence with the Sea, adjacent upland areas (primarily agricultural) that could be disturbed during construction and operation of water conveyance system(s) from the diversion location(s) to the created habitats, and agricultural drains. A buffer of approximately 0.5 mile from the Sea's shoreline and from the conveyance systems is also included for indirect effects of noise and human presence on wildlife. Figure 2-2 shows the Project area with names of places discussed in this section as well as the limits of Project activities. Data sources used to describe the affected environment include published and unpublished literature; contacts with researchers and agency personnel from the area, as well as with the Natural History Museum of Los Angeles; and field surveys for selected species of particular interest. The field surveys are described under the applicable resources below. Because the Salton Sea is continually changing, the most recent information is used where available. Often, however, information from previous years is all that is available to describe current conditions.

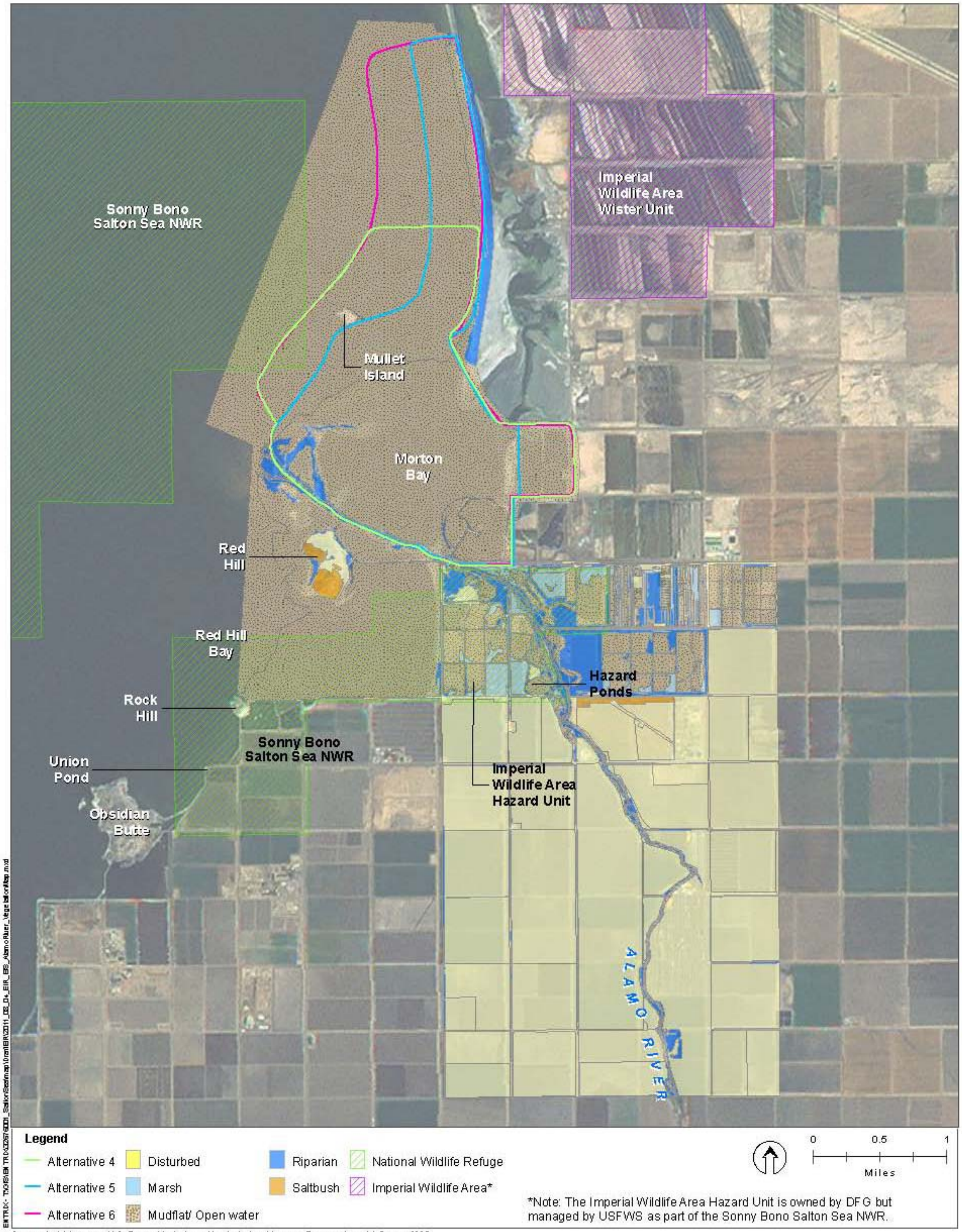
3.4.3.1 Vegetation

The *Salton Sea Ecosystem Restoration Program Final Programmatic Environmental Impact Report* (California Department of Water Resources [DWR] and DFG 2007) provided general information about vegetation around the Salton Sea. Additional data sources for the Project area included Geographic Information System (GIS) files from Redlands Institute at the University of Redlands (1999), vegetation mapping completed for Imperial Irrigation District (IID 2007), 6-inch resolution aerial photographs (Southern California Association of Governments and California Department of Transportation 2008), and site visits conducted on April 29 and November 16-18, 2010. From this dataset, a map of plant communities (Figures 3.4-1 and 3.4-2) covering areas that could be affected by the Project diversions, ponds, and supporting infrastructure was created. Categories included in the plant communities' map are presented in Table 3.4-2. Vegetation in the Project area is described below, starting with plant communities of the greatest ecological importance, primarily native and naturally occurring habitats.



Source: Aerial Imagery: U.S. Dept. of Agriculture, Nat. Agricultural Imagery Program, Imperial County, 2005.

Figure 3.4-1 Plant Communities in the Vicinity of the New River



Source: Aerial Imagery: U.S. Dept. of Agriculture, Nat. Agricultural Imagery Program, Imperial County, 2005.

Figure 3.4-2 Plant Communities in the Vicinity of the Alamo River

3

Table 3.4-2 Mapped Vegetation/Habitat in the SCH Project Area

Vegetation/Habitat Type	Subtype	Acres in the Study Area	Characteristics	Equivalent type in Manual of California Vegetation[1]	Equivalent Type in Holland[2]
Marsh	Cattail marsh	175	Dominated by *Typha* spp. Cover is typically greater than 90 percent, but can be as low as about 20 percent. Occurs in areas with some freshwater influence.	*Typha* spp. herbaceous Alliance	Transmontane freshwater marsh
	Common reed marsh	55	Dominated by *Phragmites australis.* Cover is generally at least 80 percent, but can be as low as 20 percent. Typically occurs along waterline of major rivers.	*Phragmites australis* herbaceous alliance and seminatural stands	Transmontane alkali marsh
Riparian	Iodine bush scrub	104	Relatively open stands of iodine bush (*Allenrolfea occidentalis*) that typically occur at the margins of ponds and the Salton Sea's shore.	*Allenrolfea occidentalis* shrubland alliance	Desert sink scrub
	Arrow weed thickets	4	Patches of arrow weed (*Pluchea sericea*) occur along edges of riparian areas and marshes.	*Pluchea sericea* shrubland alliance	Arrowweed
	Tamarisk woodland	185	Dominated by *Tamarix* spp. Vegetation is generally over 6 feet and forms a continuous stand. Width or individually mapped areas of at least 20 feet. Cover is generally 90 percent or greater.	Tamarix spp. Seminatural stands	Tamarisk Scrub
	Tamarisk scrub	695	Dominated by *Tamarix* spp. Vegetation is less than 6 feet tall, or made up of widely spaced individual trees. Cover is generally less than 90 percent, or less than 20 feet wide.	Tamarix spp. Seminatural stands	Tamarisk Scrub
	Screwbean mesquite bosque	4	Open stands of screwbean mesquite (*Prosopis pubescens*) and other native species in restoration areas.	*Prosopis pubescens* woodland alliance	Mesquite bosque
	Irrigation ditches	168	Drainage ditches and irrigation canals that are at least 12 feet wide and have earthen sides; concrete-lined ditches are mapped with corresponding adjacent type, generally agriculture or disturbed.	Not applicable	Not applicable
Mudflat / Open Water	Mudflat	4,530	Unvegetated recently flooded areas.	Not applicable	Not applicable

Table 3.4-2 Mapped Vegetation/Habitat in the SCH Project Area

Vegetation/Habitat Type	Subtype	Acres in the Study Area	Characteristics	Equivalent type in Manual of California Vegetation[1]	Equivalent Type in Holland[2]
	Open Water	9,367	Areas of standing water.	Not applicable	Not applicable
Saltbush	Quail bush scrub	20	Recovering disturbed upland areas around facilities and roads dominated by quail bush (*Atriplex lentiformis*).	*Atriplex lentiformis* shrubland alliance	Desert saltbush scrub
	Desert holly scrub	35	Upland stands of desert holly (*Atriplex hymenelytra*) that occurs in one location in the study area, on Red Hill; dominated by very open stands of desert holly.	*Atriplex hymenelytra* shrubland alliance	Desert saltbush scrub
Disturbed	Disturbed/Developed	1,067	Roads and development including feedlots.	Not applicable	Not applicable
	Agriculture	8,418	Any type of irrigated agriculture. Common types in study area include spinach, grass hay, and alfalfa.	Not applicable	Not applicable

Sources: Sawyer et al. 2009; Holland 1986

Waters of the U.S. and Special Aquatic Sites

SPECIAL AQUATIC SITES

Special aquatic sites within the Project area include the Sonny Bono Salton Sea National Wildlife Refuge (Sonny Bono NWR), mudflats, and wetlands. Portions of Alternatives 1 through 3 are within the Sonny Bono NWR, and mudflats are present in all of the alternatives where Sea sediments are exposed as the water level declines. Approximately 4,530 acres of mudflat are in the study area (Table 3.4-2). Effects of the Project on the NWR and mudflats will be considered when the Jurisdictional Determination is made by the Corps.

WETLANDS

Under section 404 of the CWA, wetlands are defined as "areas that are inundated or saturated by surface or ground water at a frequency sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Three parameters are used in the field to delineate wetlands: hydrophytic vegetation (more than 50 percent of dominant plants are adapted to anaerobic soil conditions), hydric soils (soils classified as hydric or that exhibit characteristics of a reducing environment), and wetland hydrology (inundation or soil saturation during at least 5 percent of the growing season = 18 days in Southern California). For the State of California, wetlands have a similar definition, but field determination of wetlands is based on only one of the three parameters. Thus, state jurisdictional wetlands have the potential to be larger than Federal jurisdictional wetlands.

Wetlands in the Project area serve important functions such as habitat for wildlife, including for special-status species, flood storage, and improving water quality. For the purposes of this Draft EIS/EIR, the amount of wetlands present in the Project area has been preliminarily identified based on aerial photography interpretation and a limited amount of ground truthing. The extent of wetlands that would be affected by the selected Project will be quantified as part of the Jurisdictional Determination to be completed by the Corps.

Duck ponds occupy over 1,000 acres near the Salton Sea on either side of the Alamo River. Ponds are temporarily filled with fresh water when managers want to attract duck species. For this reason, the ponds are filled and drained periodically. When water remains for a sufficient period of time, vegetation typical of wetlands in this region becomes established, as described below. When ponds are drained, wetland vegetation dies back. Vegetation present in duck ponds was mapped based on aerial photography interpretation and observations during site visits for the Project.

Approximately 230 acres of wetlands (marsh designation in Table 3.4-2) in the study area have been mapped as cattail (*Typha* spp.) marsh and common reed (*Phragmites australis*) marsh. Cattail marshes occasionally include other common freshwater species such as California bulrush (*Scirpus* [*Schoenoplectus*] *californicus*). A limited amount of this type is present in the Project area, and generally is found in mostly freshwater ponds, particularly near the outlet of the Alamo River. In this area, some ponds have dense, impenetrable cattail stands. Other more open ponds have narrow bands of iodine bush (*Allenrolfea occidentalis*) scrub around their perimeter.

Common reed is a nonnative perennial that grows in shallow water and at the edge of water along both the Alamo and New rivers, especially within 0.5 mile of the Salton Sea. Some ponds near the outlet of the Alamo River support dense stands of common reed at their edges or throughout.

WATERS OF THE U.S.

Waters of the U.S. refers to areas under the Corps' jurisdiction pursuant to section 404 of the CWA and is generally defined by the ordinary high water mark. The Corps' jurisdiction can extend beyond the ordinary high water mark, to the limit of the wetland, when adjacent wetlands are present. Wetlands can also occur within Waters of the U.S. The Salton Sea is a traditional navigable water, and its tributaries, the New and Alamo rivers, are Waters of the U.S. The ordinary high water mark at the Salton Sea was mapped as the -231-foot elevation contour for the impact analysis, based on the average elevation from June 21, 2009 through June 20, 2010. The Salton Sea below this elevation was determined to be waters of the U.S.

Riparian Vegetation

Riparian vegetation in the study area consists almost exclusively of tamarisk (*Tamarix* spp.) trees and shrubs and small stands of arrow weed (*Pluchea sericea*). Relatively closed-canopy stands of mature tamarisk were mapped as tamarisk woodland, generally consisting of tamarisk over 6 feet tall with a continuous canopy. More open stands and stands that consist of lower-stature vegetation were mapped as tamarisk scrub. Although tamarisk is a nonnative species, the structure of this habitat and its proximity to water are important to many wildlife species, as discussed in Section 3.4.3.3, Wildlife.

One small stand of screwbean mesquite (*Prosopis pubescens*) occurs at a restoration site along the Alamo River, and another one occurs along the New River. These areas are small and support relatively small stands of establishing trees. When the trees are mature, they may have a continuous canopy. This plant native community is considered rare and threatened throughout its range (Sawyer et al. 2009).

Upland Native Vegetation

Several small stands of native upland vegetation consisting of quail bush (*Atriplex lentiformis*) scrub and desert holly (*Atriplex hymenelytra*) scrub occur in widely scattered locations in the Project area.

Nonvegetated Areas

Approximately 4 percent of the study area is primarily disturbed and developed areas such as roads, buildings, and a geothermal facility near the Alamo River. In addition, a large (approximately 427-acre) feedlot adjacent to the Alamo River was mapped as disturbed/developed. Other nonvegetated areas include mudflats and open water.

Agriculture

The majority (34 percent) of the study area is irrigated agriculture, and the primary agricultural crops present at the time of the November 2010 site visit included spinach, various types of grass hay, and alfalfa. No orchards, vineyards, or other woody crops were present in the study area, although several orchards were noted west of the New River, south of the study area.

Irrigation Ditches

Irrigation ditches include both drains taking water away from the fields and water supply canals bringing water to the fields. For the purposes of this analysis, irrigation ditches that have earthen sides and are more than about 12 feet wide were included in the mapped category “drainage ditches.” Vegetation specific to each ditch was not recorded because it changes over time based on use of an individual ditch, level of salinity, and frequency and timing of vegetation clearing by the landowner. Hence, vegetation determinations made at one point in time are of limited use for this analysis. Concrete-lined irrigation ditches were mapped with the adjacent agriculture or disturbed/developed category because the biological value of lined ditches is very limited.

3.4.3.2 Aquatic Habitats and Biota

Three discrete biological phases, based primarily on water chemistry and species abundance, have occurred at the Salton Sea since it formed in 1905. The initial “Freshwater Phase” began when the basin first started filling and continued until the Sea's salinity became similar to ocean water in the early 1940s. The "Marine Phase" was the period during which the Salton Sea salinity remained near that of ocean water (about 34,000 milligrams per liter = 34 parts per thousand [ppt]) and occurred from the 1940s into the 1980s. The "Hypersaline Phase" began in the 1980s when salinity levels exceeded 40 ppt and continues into the present (DWR and DFG 2007). The Sea's salinity level is currently 51 ppt, which is approximately 50 percent higher than ocean water (DWR 2010).

Inflow to the Sea comes from sources such as the Whitewater, Alamo, and New rivers; agricultural drains; and several small streams. These inflows contain salts from natural soil leaching, treated wastewater, and Colorado River water used for crop irrigation. Evaporation is high in this area (approximately 69 inches/year) (DWR and DFG 2007), resulting in loss of water from the Sea's surface while leaving the salts. The inflows vary on scales ranging from daily to multiyear while no outflows occur to remove water or salts.

Salton Sea Aquatic Habitats

The Salton Sea supports aquatic habitats that function at multiple scales to contribute to the overall biological diversity and use of the area by fish and wildlife. The Sea's aquatic habitats include its shoreline and associated shallow water areas, open (deep) water, and areas where the New, Alamo, and Whitewater rivers enter the Sea.

Shoreline/Shallow Water. The shallow shoreline area extends around the Sea's perimeter and around islands within the Sea. At a surface elevation of -228 feet mean sea level (msl), the Salton Sea has approximately 120 miles of shoreline. The area occupied by this shallow water habitat is influenced by topography, with a relatively narrow band of habitat occurring on the steeper slopes (e.g., eastern and western shores) with considerably greater amounts of this habitat along the more gently sloping northern and southern shores. Along the Sea's southeastern edge, particularly near Imperial Wildlife Area's (IWA's) Wister Unit, relatively flat areas periodically form large mudflats (DWR and DFG 2007).

The substrate along the Salton Sea's shoreline, especially at depths of less than 1 foot, is composed of intact and broken barnacle shells and unconsolidated sediments ranging from coarse sand to gravel (Detwiler et al. 2002). Hand auger and vibracore samples within the proposed Project area found sediments within the top 1 foot to be primarily clays (e.g., fat clay or lean clay) with some areas of silt or mixed silt/sand; shell fragments were present at some locations along the shoreline (Appendix C). Pools along the shoreline formed by sand or barnacle shell bars parallel to shore and connected to the Salton Sea and/or drains vary in size over time due to changes in the Sea's water surface elevation (DWR and DFG 2007). The size of these pools ranged from about 100 acres to less than 1 acre (Sutton 1999).

In some areas along the Salton Sea, trees killed by inundation from past increases in the water elevation remain in shallow water along the shoreline. Most of the snags are located in the Whitewater River delta, near IWA's Wister Unit, and at Morton Bay (DWR and DFG 2007). The submerged portions of snags provide structure and habitat diversity in the water column. These structures are not permanent, and they continue to degrade and collapse over time. Other structures situated in inundated areas also provide a similar function.

Open Water. The vast majority of the Salton Sea (currently over 200,000 acres) is open water with depths of up to 46 feet. The Sea's open water areas are subject to periodic events that can make large portions of the Sea lethal or uninhabitable to most aquatic life. During parts of the year, the Salton Sea becomes stratified with cooler water forming a distinct layer below the warmer surface water. This lower layer becomes anoxic (deprived of oxygen) because of its isolation from the surface and the photosynthetic activity that occurs in that portion of the water column where light can penetrate. The combination of high levels of organic material and biological activity in the sediments under anoxic conditions produce toxic compounds, such as hydrogen sulfide. These compounds are periodically released to the surface waters when thermal stratification breaks down during high winds and seasonal changes in air temperature. During these turnover events, aquatic life (especially fish) can be killed over vast areas of the Sea. The effect of these events is less pronounced in the nearshore areas that remain oxygenated year-round (DWR and DFG 2007).

River Mouths and Deltas. The primary inflows into the Salton Sea include the New and Alamo rivers in the south and the Whitewater River in the north. Smaller inflows come from San Felipe Creek in the west and Salt Creek in the east as well as numerous agricultural drains that discharge directly into the Sea. These inflows result in estuarine areas where the inflow mixes with the Sea's saline waters. The size of these estuarine areas is influenced primarily by the amount of inflow. The New and Alamo rivers, which constitute nearly 80 percent of the inflow to the Salton Sea, contribute to the largest of these areas. Factors such as depth, inflow quality, and wind conditions also influence the habitat at the river mouths/deltas. Sediment deposition in these areas forms deltas that contribute to the complexity and diversity of the habitat. Similar conditions occur at the mouth of the Whitewater River and, to a lesser extent, the mouths of creeks and agricultural drains that discharge directly to the Salton Sea. These areas are relatively small, yet very productive (DWR and DFG 2007).

The size of the areas influenced by inflow varies on a daily to seasonal basis in relation to the volume of water discharged to the Salton Sea at each location. Brackish waters ranging from 10 to 30 ppt extend about 1,600 to 3,300 feet offshore from the New and Alamo river mouths (Costa-Pierce 2001), with the larger areas occurring during summer when irrigation runoff is high. The size of the area influenced by the brackish water inflow from the New and Alamo rivers is estimated to be about 100 to 250 acres (Costa-Pierce and Riedel 2000).

Other Aquatic Habitats

Other aquatic habitats associated with or adjacent to the Salton Sea include the Whitewater, New, and Alamo rivers; San Felipe and Salt creeks; numerous agricultural drains, some of which discharge directly to the Salton Sea; and managed freshwater marshes. Only the New and Alamo rivers and a number of drains are within the SCH Project study area.

Rivers and Drains. Both the New and Alamo rivers were modified by the same event that created the current Salton Sea (CRBRWQCB 2006). The Alamo River is the Sea's largest tributary, contributing approximately 50 percent of the Sea's annual inflows. The Alamo River's source of water is almost entirely from discharge of agricultural irrigation water (imported from the Colorado River) from over 900 miles of agricultural drains in the Imperial Valley (CRBRWQCB 2002a). The New River originates in Mexico and flows through Mexicali before entering the U.S. Flow in the river is primarily (87 percent) from agricultural drain discharges; other water sources are treated municipal and industrial wastewater from Imperial Valley (2 percent), partially treated and untreated municipal and industrial wastewater from Mexico (8 percent), and stormwater runoff (3 percent) (CRBRWQCB 2002b). Both rivers carry a high sediment load. Generally small areas of fresh to brackish marsh are present in some of the drains and in low areas adjacent to the rivers.

Freshwater Marsh. In the Salton Sea Basin, areas constructed and managed for waterfowl are the primary areas that represent freshwater marsh. Depending on the goals of the managing entity, these marshes are flooded perennially or seasonally, and support no vegetation to vegetative communities dominated by cattails, tules, or other aquatic vegetation interspersed with areas of open water and islets. Managed marsh areas adjacent to the Salton Sea include portions of the existing Sonny Bono NWR, IWA, and duck clubs. Operations of the existing managed marshes are constrained by the availability of fresh water (DWR and DFG 2007).

Presently, Sonny Bono NWR contains approximately 826 acres of freshwater marsh (USFWS 2010a). Additional freshwater marsh is present in the IWA. In addition to the freshwater marsh within these two areas, about 10,309 acres of duck ponds were present in IID's service area in 2009 (IID 2010). The duck ponds are generally located in northern Imperial Valley between Niland and the Salton Sea. The ponds typically are small and heavily vegetated with aquatic vegetation. These freshwater marsh areas are flooded seasonally to coincide with the waterfowl hunting season and to promote characteristics attractive to waterfowl.

Salton Sea Aquatic Biota

Aquatic biota in the Salton Sea include invertebrates and fish. The initial aquatic biota (both invertebrates and fish) present in the Salton Sea were those that came in with the water from the Colorado River. Species from the rivers, creeks, and drains also entered the Sea. Subsequently, a variety of invertebrate and fish species have been stocked in the Sea as salinity increased. Invertebrates also entered the Sea in the water with the stocked fish. Aquatic organisms that currently or in the recent past comprise the food web supporting fish in the Sea include phytoplankton, zooplankton, and benthic and water column macroinvertebrates. Macroinvertebrate species include diptera (flies), corixids (water boatmen), benthic polychaetes such as pileworms (*Neanthes succinea*) and a spionid worm (*Streblospio benedicti*), amphipods (*Gammarus mucronatus* and *Corophium louisianum*), ostracods (seed shrimp), and a barnacle (*Balanus amphitrite*) (Detwiler et al. 2002; Miles et al. 2009) while zooplankton is dominated by copepods (Miles et al. 2009).

Between 1929 and 1956 nonnative fish were introduced into the Sea on more than 20 occasions consisting of more than 30 species, some of which were introduced repeatedly (Walker 1961). Between 1948 and 1956, DFG introduced fish with the intention of creating a marine sport fishery (Walker 1961). Although a number of fish species were present in the Salton Sea while salinity was in the range of marine waters, those fish were introduced for recreational fishing and not as forage for birds. Tilapia that inhabit the Sea are hybrids between the Mozambique tilapia (*Oreochromis mossambicus*) and Wami River tilapia (*O. urolepis hornorum*) (Costa-Pierce 2001). These fish, called California Mozambique hybrids ("Mozambique hybrid tilapia"), are currently the most abundant fish in the Sea and have been extensively used as forage by birds due to their range in size classes and location within the water column that make them available for bird foraging.

The shoreline pools and shallow waters provide habitat for desert pupfish (*Cyprinodon macularius)* (discussed in more detail below under Special-Status Species) (Sutton 1999) and sailfin molly (*Poecilia latipinnna*), as well as other fish and invertebrates. These areas also provide important spawning and nursery habitat for tilapia. The smaller fish in shallow waters feed on invertebrates as well as algal material. Rocky shoreline habitats also provide valuable refugia for invertebrates during periods when hypoxic or anoxic conditions persist in the Salton Sea (Detwiler et al. 2002).

The open water supports fish and invertebrate production. Until recently, these areas also provided habitat for pelagic spawning fish such as orangemouth corvina (*Cynoscion xanthulus*). Orangemouth corvina, along with Gulf croaker (*Bairdiella icistia*) and sargo (*Anisotremus davidsoni*), have not been detected in the Sea since 2003 (DFG 2008) and are probably no longer present due to the Sea's increased salinity. The distribution of fish in the open water is concentrated along the nearshore areas. The Salton Sea's tilapia (Mozambique hybrid tilapia) population has risen considerably since 2003, contributing to elevated fish numbers in the Sea (DFG 2008).

The river mouths, particularly in the Sea's southern part, provide an area of reduced salinity and higher dissolved oxygen (DO). Mozambique hybrid tilapia is the only fish species that has been recently collected near the river mouths, although common carp (*Cyprinus carpio*), threadfin shad (*Dorosoma petenense*), striped mullet (*Mugil cephalus*), striped bass (*Morone saxatilis*), and mosquitofish (*Gambusia* *affinis*) occasionally enter the Sea from the rivers (personal communication, S. Keeney 2011). In the past, orangemouth corvina had been reported to congregate (possibly for spawning) where freshwater flows into the Salton Sea, possibly due to higher DO or better water quality (Costa-Pierce 2001). No amphibians occur within the Salton Sea itself due to the high salinity.

Other Habitat Aquatic Biota

Invertebrates in the Alamo River and agricultural drains include plankton, snails, midge larvae (chironomids), Asiatic clams (*Corbicula fluminea*), and crayfish (CRBRWQCB 2002a). Fish species present in the New River include blue tilapia (*Oreochromis aureus*), common carp, and channel catfish (*Ictalurus punctatus*) (personal communication, J. Crayon 2010; U.S. Department of Health and Human Services 2000). Other species reported in the Alamo and/or New rivers include orangemouth corvina, Mozambique tilapia, threadfin shad, channel catfish, flathead catfish (*Pylodictis olivaris*), red shiner (*Cyprinella lutrensis*), largemouth bass (*Micropterus salmoides*), and mosquitofish (CRBRWQCB 2002a; Costa-Pierce and Riedel 2000).

Fish in the agricultural drains include sailfin molly, red shiner, mosquitofish, longjaw mudsucker (*Gillichthys mirabilis*), common carp, desert pupfish, shortfin molly (*Poecilia mexicana*), porthole livebearer (*Poeciliopsis gracilis*), Mozambique tilapia hybrids, redbelly tilapia (*Tilapia zillii*), and possibly blue tilapia (*Oreochromis aureus*) (Crayon and Keeney 2005; personal communication, J. Crayon 2010, S. Keeney 2011; CRBRWQCB 2005). Spiny softshell turtles (*Apalone spinifera*), bullfrogs (*Lithobates catesbeianus*), and Rio Grande leopard frogs (*Lithobates berlandieri*) are also present in the rivers and agricultural drains; the checkered garter snake (*Thamnophis marcianus*) occurs in agricultural drains/canals and marshes (personal communication, J. Crayon 2011).

Aquatic Biota Habitat Requirements

The SCH ponds are being designed to support fish that provide prey for piscivorous birds (Appendix D). A number of fish species have been evaluated for introduction to the ponds; however, only species that are currently or have been present in the recent past and that generally are not predators on desert pupfish are being considered (DFG 2011b). Table 3.4-3 summarizes the habitat requirements of the fish species most likely to be introduced into the ponds. Salinity, temperature, and DO levels that will support fish will also support invertebrates and other components of the aquatic food web.

Table 3.4-3 Fish Habitat Requirements

Species	Salinity (ppt)	Temperature (°C)	DO	Breeding	Food
Mozambique tilapia (hybrid)	0-65	15-37	Relatively low	Maternal mouthbrooder	Plankton, aquatic invertebrates, decomposing organic matter
Redbelly tilapia	0-29 (45 in Sea)	20-40	Relatively low	Lay eggs in nest and guard	Plants, some invertebrates
Sailfin molly	0-87	Tolerate local temperatures	Relatively low	Internal livebearers	Algae and other plant material, some aquatic invertebrates
Threadfin shad	15-32	1-35 (die-offs below 5.5)	Sensitive to sudden changes in DO	Spring and fall in open water over or near objects	Zooplankton, pelagic fish eggs and larvae, phytoplankton
Desert pupfish	0-68	7-42.5	Extremely low (to 0.1-0.4)	Lay eggs over substrate	Algae, small invertebrates, detritus

3.4.3.3 Wildlife

The principal references reviewed to obtain information regarding wildlife, including special-status wildlife, within the Project area and a buffer of 0.5 mile are:

- The DFG California Natural Diversity Database (CNDDB) *Special Animals List*, reviewed in 2010;
- *Birds of the Salton Sea* (Patten et al. 2003) for descriptions of status and habitats on or adjacent to Project site;
- Birds of North America Online for range and habitat descriptions from various authors;
- Natural History Museum of Los Angeles County;
- Sonny Bono NWR (USFWS 2010b, c) occurrence data; and
- Studies on patterns of abundance, distribution, annual phenology, and habitat associations (Shuford et al. 2000).

In addition, observations of wildlife during focused surveys for Federally listed bird species (Dudek 2010) were recorded.

Common Bird Species

The Salton Sea ecosystem has become one of the most important habitats for birds in North America and supports some of the highest levels of avian biodiversity in the southwestern United States. Recent studies have documented the great importance of the Salton Sea ecosystem in providing habitat for migrating and resident waterbirds, particularly those migrating within the Pacific Flyway. More than 400 resident, migratory, and special-status bird species have been recorded in the Salton Sea Basin; about 270 of those species, including 33 bird species that are threatened, endangered, or of special concern (see Section 3.4.3.4), use the Basin on a regular basis. In addition to the diversity of birds, studies have indicated that the large number of individual birds using the Salton Sea is even more ecologically relevant than the number of species due to its importance as a migratory stopover and wintering area for hundreds of thousands of birds (DWR and DFG 2007).

The Basin provides important habitat for 48 species of gulls (40,000+ individuals), terns, and shorebirds. It is one of only five areas in the interior of western North America used by tens of thousands of birds in spring (Shuford et al. 2000). Some common aquatic bird species for which the Salton Sea provides important habitat include American avocet (*Recurvirostra americana*), American coot (*Fulica americana*), American wigeon (*Anas americana*), American white pelican (*Pelecanus erythrorhynchos*) (30 percent of North American breeding population), black-necked stilt (*Himantopus mexicanus*), California brown pelican (*Pelecanus occidentalis*), eared grebe (*Podiceps nigricollis*) (90 percent of North American population in some years), and ruddy duck (*Oxyura jamaicensis*) (50 percent of Pacific Flyway population) (USFWS 2010b; Shuford et al. 2000; Jehl 1994). Bird populations vary throughout the year as birds migrate to the Sea for breeding and as they stop over during migration to points north and south. The American avocet, American coot, American white pelican, California brown pelican, and ruddy duck are all found at the Salton Sea throughout the year. The American wigeon and eared grebe are absent for a few months in the summer (USFWS 2010b).

Point count surveys conducted within and near the Project area in 2009 (USFWS 2010b) show that the American avocet population is more abundant during August and September with numbers of individuals reaching into the thousands, while the American coot's population is greatest in March with numbers of individuals also reaching the thousands. The American wigeon is present in greater numbers in January and February with counts of over 5,000 individuals and is absent from the Salton Sea during the summer months (June through September). American white pelican populations peak twice during the year, first from January through March and then again from July through September with populations in the low thousands and then remaining in the hundreds during other months. California brown pelicans follow a similar pattern with a population increase in January and then again from June through September. The eared grebe population is greatest in January with a peak of over 5,000 individuals, which then declines in the summer and fall months. The ruddy duck population is highest in the winter to early spring (November through April) with the greatest numbers occurring in February (over 13,000 individuals), which then also declines in the summer months.

Numerous other bird species occur within the Project region as residents, visitors, and migrants. A total of 107 species of waterbirds were recorded for the Salton Sea in 1999 (Shuford et al. 2002) and include western and Clark's grebes (*Aechmophorus occidentalis* and *A. clarkii*, respectively); wading birds such as herons, egrets, and night-herons; and a number of waterfowl species such as snow (*Chen caerulescens*) or Ross's (*Chen rossii*) geese, northern shoveler (*Anas clypeata*), northern pintail (*Anas acuta*), and green-winged teal (*Anas crecca*). A number of raptor species have been recorded at the Salton Sea, most of which are discussed below. Shorebird species and numbers tend to peak during migration with large numbers of black-bellied plover (*Pluvialis squatarola*), black-necked stilt (also occurs in large numbers as a breeding species), willet (*Tringa semipalmata*), marbled godwit (*Limosa dedoa*), western sandpiper (*Calidris mauri*), least sandpiper (*Calidris minutilla*), dowitchers (*Limnodromus* spp.), and Wilson's phalarope (*Phalaropus tricolor*).

The Caspian tern (*Hydroprogne caspia*) is a common breeding bird that occurs within the Salton Sea region from mid-April through October. It is most abundant at the Sea from late summer through fall. Most Caspian terns depart from the region by the end of October, but some remain through the winter (Patten et al. 2003). Caspian terns forage primarily or exclusively for fish but may occasionally take crayfish and insects (Cuthbert and Wires 1999). Approximately 25 percent of the North American population of the Caspian tern breeds at the Salton Sea (Cuthbert and Wires 1999; personal communication, K. Molina 2010). In 2009, the population size within the Project area was in the hundreds for the winter months and in the thousands for the breeding season (USFWS 2010b). In 2010, nesting numbers of Caspian terns were up to several thousand breeding pairs, predominantly on Mullet Island and the D pond islands but also along Morton Bay's shore (personal communication, K. Molina 2010).

In 2009, the California gull (*Larus californicus*) was found at the Salton Sea, primarily in December (USFWS 2010b). A few occurrence records are present for January, May, and June, although the numbers are much lower than the counts from December. This species was observed during summer 2010 surveys (Dudek 2010), and Molina (2004) states that the California gull colonized the Sea in 1996 and has nested annually since then in small numbers. It also winters at the Sea (Winkler 1996) and can be found throughout the year (USFWS 2008).

The double-crested cormorant (*Phalacrocorax auritus*) is a year-round resident of the Salton Sea with the highest counts occurring in November, December, and February; however, populations remain steadily in the thousands throughout the year. They nest regularly at the Sea. The largest nesting colony was on Mullet Island off the southeastern shore (Massey and Zembel 2002), but they also nest along the Alamo River (personal communication, K. Molina 2010) as discussed below for rookeries.

The laughing gull (*Leucophaeus atricilla*) was only observed at the Salton Sea in August during 2009 bird counts (USFWS 2010b), but was observed during summer 2010 surveys (Dudek 2010), and it is a fairly common summer and fall visitor. The Sea is the only area where the laughing gull occurs regularly in the western U.S. It has been observed nesting at Sonny Bono NWR after several decades of no breeding activity (Patten et al. 2003).

The long-billed curlew (*Numenius americanus*) is present throughout the year at the Salton Sea, but thousands occur in the Imperial Valley in the winter (20 percent of world population) (Audubon California no date). Those staying year-round are likely first-year birds, and they concentrate around Red Hill, Obsidian Butte, and Bruchard Bay (Patten et al. 2003). In 2009 (USFWS 2010b), the long-billed curlew population was greatest in July and November. This species was observed during summer 2010 surveys (Dudek 2010). Curlews may occur along the mudflats and shoreline but occur in highest numbers in agricultural lands.

Least terns (*Sternula antillarum*) at the Salton Sea may be either from coastal California or more likely from Mexico. It has not been recorded breeding at the Sea, but may breed due to recent observations of pairs. This species was not observed in the 2009 aquatic surveys (USFWS 2010b) or by Dudek in 2010. The least tern probably occurs at the Sea on an annual basis and has been observed at Sonny Bono NWR's Unit 1, Red Hill, IWA's Wister Unit, and at other locations farther away from the Project area. It occurs most often on mudflats and at the deltas of the New and Alamo rivers where it forages in fresh water in rivers or ponds (Patten et al. 2003).

The Salton Sea is an important migratory stopover for thousands of black terns (*Chlidonias niger*), but the species does not breed at the Sea (Patten et al. 2003; Shuford et al. 2000). In 2009, it was most abundant in May and then occurred in smaller numbers from June through December (no records for November) (USFWS 2010b). It was also observed during summer 2010 surveys (Dudek 2010) and could utilize open water and marshes around the Project area.

The northern harrier (*Circus cyaneus*) is a common winter visitor and is a nonbreeding summer visitor (Patten et al. 2003); it was also observed on several occasions during the summer 2010 surveys (Dudek 2010). Suitable foraging habitat within the Project area includes agricultural fields, marshes, and open scrub habitats.

The white-faced ibis (*Plegadus chihi*) occurs in large numbers at the Salton Sea as a winter visitor (up to 50 percent of California population) (National Audubon Society 2011) and migrant (30 percent of world population) (Audubon California no date). It also is a nonbreeding summer visitor with numbers often exceeding 15,000 year-round (Patten et al. 2003; Shuford et al. 2000). It has attempted to nest periodically, and a relatively small colony is located at Finney Lake outside of the Project area. In 2010, the species was observed flying overhead in flocks of several hundreds of individuals (Dudek 2010). It nests in marsh habitat and forages in muddy ground and marshes; in shallow ponds, lakes, and rivers; and in flooded fields and estuaries. CNDDB has records from 1980 near the New River mouth.

The American white pelican (*Pelecanus erythrorhynchos)* formerly bred at the Salton Sea up to the 1950s but occurs now primarily as a migrant and winter resident. The Sea is an important wintering site for approximately 30 percent of the North American breeding population of American white pelicans and at times supports a substantial proportion of the species' world population (Patten et al. 2003; Shuford et al. 2000). As recently as 1999, nearly 23,000 individuals were observed in aerial surveys at the Sea (Shuford et al. 2000). Wintering birds congregate at the river mouths, loaf on sandbars and mudflats, and forage in shallow water. In 2009, the American white pelicans were most abundant in August with almost 3,000 individuals recorded near and within the Project area; numbers declined in the fall but the species remained a consistent visitor throughout the year (USFWS 2010b). This species was observed during Summer 2010 surveys near the mouths of the New and Alamo rivers and along the shoreline foraging within the Sea in rafts of several hundred (Dudek 2010); suitable loafing habitat includes sandbars and mudflats within the Project area.

Riparian Bird Species

A total of 115 species of birds were recorded within or adjacent to the riparian habitat along the New and Alamo rivers during the focused riparian surveys in 2010 (Dudek 2010). Bird species associated with riparian habitat that were commonly observed included song sparrow (*Melospiza melodia*), Abert's towhee (*Melozone aberti*), verdin (*Auriparus flaviceps*), house finch (*Carpodacus mexicanus*), black phoebe (*Sayornis nigricans*), common yellowthroat (*Geothlypis trichas*), red-winged blackbird (*Agelaius phoeniceus*), and marsh wren (*Cistothorus palustris*) (Dudek 2010).

Rookeries

A number of bird species occur at the Salton Sea as colonial nesting species specifically using rookeries including double-crested cormorant, great blue heron (*Ardea herodius*), and great (*Ardea alba*), snowy (*Egretta thula*), and cattle (*Bubulcus ibis*) egrets. During the 2010 focused surveys, rookeries of the double-crested cormorant and great blue heron were observed at the mouth of the Alamo and New rivers. The double-crested cormorant also breeds on Mullet Island in one of the largest North American colonies (Shuford et al. 2002). Great blue herons also are recorded within rookeries along the shoreline around IWA's Wister Unit and the New River delta (Shuford et al. 2000; Patten et al. 2003). The great blue heron does not form dense nesting colonies, but the species uses snags of partly submerged dead trees at the Salton Sea. Great egret nesting tends to be more colonial with sites concentrated along the shoreline at IWA's Wister Unit and Morton Bay around the delta of the New River (Patten et al. 2003). Similar to the great blue heron, the great egret nests in partially submerged snags. The snowy egret is similar to the great egret in nesting behavior and locations (Patten et al. 2003). At the Salton Sea, the cattle egret establishes massive rookeries (Patten et al. 2003), and during the 2010 surveys, hundreds to thousands of individuals were observed flying up and down the New and Alamo rivers (Dudek 2010). The rookeries for the cattle egret were only located along the Alamo River (Shuford et al. 2002; Dudek 2010).

Other Terrestrial Wildlife Species

A number of common terrestrial wildlife species occur in the Project area. Common terrestrial reptiles include side-blotched lizard (*Uta stansburiana*), desert spiny lizard (*Sceloporus magister*), western diamond-backed rattlesnake (*Crotalus atrox*), and gopher snake (*Pituophis catenifer*). They are found in upland habitats within the Project area, especially in habitat associated with agricultural development that provides subsidies of water and forage species. Common mammals of riparian, upland, and agricultural habitats of the Project area include coyote (*Canis latrans*), raccoon, (*Procyon lotor*), muskrat (*Ondatra zibethicus*), Virginia opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), desert cottontail (*Sylvilagus audobonii*), round-tailed ground squirrel (*Spermophilus tereticaudus*), and western pocket gopher (*Thomomys bottae*).

3.4.3.4 Special-Status Species

Special-status species are defined here as plants and animals that are:

- State and/or Federally listed as threatened or endangered;
- Proposed or candidates for state or Federal listing;
- California Native Plant Society (CNPS) List 1B and List 2;
- State Species of Special Concern (SSC); and
- California fully protected.

Focused surveys for the least Bell's vireo and southwestern willow flycatcher, both state and Federally listed as endangered, were conducted for the Project from May through July 2010 (Dudek 2010). Other listed and special-status species were also recorded when observed during these surveys.

For the least Bell's vireo, the currently accepted USFWS protocol (2001) was followed and included eight site visits spaced approximately 10 days apart.

For the southwestern willow flycatcher, the USFWS-approved protocol (Sogge et al. 2010) was followed. This protocol involved 5 surveys between May 15 and July 17 that were separated by at least 5 days using recorded southwestern willow flycatcher vocalizations to induce southwestern willow flycatcher responses. Various subspecies of willow flycatcher are not easily differentiated visually or by call or song in the field, and any resident willow flycatchers observed in the final survey period were assumed to be the "southwestern" subspecies. Nonresident willow flycatchers (those not observed during the third survey period) were assumed to be migrant willow flycatchers. Surveys for the southwestern flycatcher were conducted under section 10(a), Permit Numbers TE-781084, TE-813545, TE-840619, and TE-051248.

Table 3.4-4 lists the special-status species known or that have the potential to be present in the Project area. Species with no known records in the area, for which focused surveys were negative, for which the species would not be present during the "season of concern" as addressed for bird Species of Special Concern (Shuford and Gardali 2008), for which CNDDB does not track the life stage during which they are present at the Salton Sea, or for which suitable habitat is not present within or near areas that could be affected by the SCH Project, are not included in this table. Species evaluated but not meeting the criteria to be in Table 3.4-4 are listed in Appendix H along with the reasons why they were not included for analysis in this document.

Table 3.4-4 Special-Status Species Potentially Affected by the SCH Project

Common Name	Scientific Name	Status (Fed / State / CNPS)	Potential to be Present/Notes
Fish			
Desert pupfish	*Cyprinodon macularius*	E / E / –	High. Inhabits the Salton Sea and associated shoreline pools (some may not be connected to the Sea), tributaries to the Sea, and many of the drains that empty directly into the Sea.
Birds			
Redhead	*Aythya americana*	– / SSC / – (breeding)*	High. Uses lacustrine waters, foothills and coastal lowlands, and along the coast and Colorado River. Nests in freshwater emergent wetlands bordering open water. Fairly common breeding resident at the Salton Sea, breeding in freshwater habitats with dense cover at the margins such as found around Sonny Bono NWR. They may also nest in drains with slow-moving water if emergent vegetation is present for cover (Patten et al. 2003). Observed during summer 2010 surveys at the mouth of the Alamo River and observed flying along the river channel (Dudek 2010).
White-tailed kite	*Elanus leucurus*	– / FP / –	High. Use open grasslands, savannah-like habitats, agricultural fields, wetlands, oak woodlands, and riparian habitats. Suitable habitat within the Project area includes tamarisk woodland for nesting and agricultural lands and other sparsely vegetated areas to forage for small rodents. Although the kite is typically a migrant and winter visitor to the Salton Sea region, it has nested on occasion in Imperial Valley and appears to be expanding its range. It was recorded nesting at the mouth of the New River in 1993 and may have nested along the New River in 2000 (outside the Project area) east of Fig Lagoon and near

Table 3.4-4 Special-Status Species Potentially Affected by the SCH Project

Common Name	Scientific Name	Status (Fed / State / CNPS)	Potential to be Present/Notes
			Brawley (Patten et al. 2003).
Bald eagle	*Haliaeetus leucocephalus*	D / E+FP / –	Moderate. Seacoasts, rivers, swamps, large lakes; winters at large bodies of water in lowlands and mountains. This species is a rare winter visitor. Bald eagles forage over open water and could utilize the Project area for foraging. No suitable nesting areas are within the Project area. One juvenile observed near the New River in June 2010 surveys (Dudek 2010) was likely a transient.
American peregrine falcon	*Falco peregrinus anatum*	D / E+FP / –	Moderate. Nests on cliffs, buildings, bridges; preys on birds over wetlands, riparian, meadows, and croplands, especially where waterfowl are present. The species is a rare perennial visitor in both summer and winter but is not likely to breed within the Project area due to lack of suitable cliff areas. Suitable foraging areas within the Project area include agricultural land, marshes, mudflats, and open scrub habitats. Observed on two occasions near the New and Alamo rivers during surveys in July 2010 (Dudek 2010). Three individuals were observed flying over a mudflat near the Alamo River on one occasion. These observations could indicate nesting nearby or dispersal movements.
California brown pelican	*Pelecanus occidentalis californicus*	D / D+FP / –	High. Dispersing juveniles and post-breeding adults from Baja California forage around the Salton Sea's margins in summer. Over 5,000 individuals were observed in 2005 and 2006 (DWR and DFG 2007). A few have nested, primarily at the southern end of the Sea at the Alamo River mouth (Molina and Sturm 2004). The species was observed foraging over the Sea at the mouths of the New and Alamo rivers and along the shoreline during Summer 2010 surveys (Dudek 2010).
Least bittern	*Ixobrychus exilis*	– / SSC / – (breeding)*	High. Dense emergent wetland vegetation, sometimes interspersed with woody vegetation and open water. Has been recorded as breeding in the Salton Sea and surrounding areas especially in association with the rivers and irrigation ditches (Patten et al. 2003). It is considered a fairly common breeder at the Salton Sea, breeding near the Whitewater River mouth and at the Sea's southern end, at IWA's Wister Unit, as well as Fig Lagoon (Shuford and Gardali 2008). The species was recorded during 2009 marsh surveys conducted by Sonny Bono NWR (USFWS 2010b) and DFG on IWA's Wister Unit (DFG 2009); a total of six and nine individuals, respectively, were recorded but the locations were not mapped. Surveys during 2010 recorded 10 detections (DFG 2011a). Observed during Summer 2010 surveys in marshes adjacent to the Alamo River (Dudek 2010).
Wood stork	*Mycteria americana*	– / SSC / – (post-breeding)*	High. Shallow, relatively warm waters where it forages for fish and other vertebrate prey. Nests colonially. Based on observations of the species in the Salton Sea region, the wood stork occurs as an uncommon post-breeding visitor that is observed regularly every year (Patten et al. 2003). Limited to the Sea's southern and southeastern shores, along the lowermost portions of the Alamo River delta and adjacent shoreline north to IWA's Wister Unit (Shuford and Gardali 2008). Observed during Summer 2010 surveys along the Alamo River

Table 3.4-4 Special-Status Species Potentially Affected by the SCH Project

Common Name	Scientific Name	Status (Fed / State / CNPS)	Potential to be Present/Notes
			(Dudek 2010).
Greater sandhill crane	*Grus canadensis tabida*	– /T+FP / –	Low. The subspecies is an uncommon winter visitor but occurrences have been increasing in recent times (Patten et al. 2003). Habitat is same as described for the lesser sandhill crane.
Lesser sandhill crane	*Grus Canadensis Canadensis*	– / SSC / – (wintering)*	Moderate. Pastures, moist grasslands, alfalfa fields, and shallow wetlands for loafing sites during winter. Omnivorous; forages for invertebrates, small mammals, waste grains, and seeds (Shuford and Gardali 2008). Salton Sea region hosts the only regularly wintering cranes south of the Central Valley. Most of the cranes observed in the Imperial Valley are lesser sandhill cranes (Patten et al. 2003). In 2009, a crane roost (not determined if it was the lesser or greater subspecies) was documented at the Sea in Unit 1 of Sonny Bono NWR (USFWS 2010c). Uses of the fields and roost locations vary and are unpredictable because the species is nomadic and may randomly use the Project area where habitat is suitable.
California black rail	*Laterallus jamaicensis coturniculus*	– /T+FP / –	Low. Saline, brackish, and fresh emergent wetlands, especially cattail and bulrush, with a thick understory and moist mud or a thin veil of water but may also occur where tamarisk and common reed are. It was recorded at Calipatria, Finney Lake, Whitewater River, and Salt Creek but has not been detected at these locations since the 1980s. Several individuals were detected at the mouth of the New River in 1989, but none were detected in later surveys (Shuford et al. 2000). Although this species is expected to be present as a resident within the Salton Sink, it may only be sporadic (Patten et al. 2003). It was not recorded within the 2009 marsh surveys conducted by Sonny Bono NWR (USFWS 2009) or by DFG on IWA's Wister Unit in 2010 (DFG 2011a). The species was recorded by DFG on the Wister Unit in 2009 but was not mapped (DFG 2009). Recorded in CNDDB for marsh habitat in upstream portions of the Alamo River near Calipatria.
Yuma clapper rail	*Rallus longirostris yumanensis*	E / T+FP /–	High. Freshwater marsh. Prefers stands of cattails and tules dissected by narrow channels of flowing water. CNDDB records from 1978 near the mouths of the Whitewater and New rivers. Also a CNDDB record from 1990 northeast of the Alamo River mouth. Recent surveys for this species indicate it is found in Sonny Bono NWR marshlands (96 detections; USFWS 2009). On IWA's Wister Unit 191 birds were detected in 2009, and 132 locations had positive detections in 2010 (DFG 2009; DFG 2011a). Detected twice during Summer 2010 surveys in freshwater marsh areas adjacent to the Alamo River (Dudek 2010).
Mountain plover	*Charadrius montanus*	– / SSC / – (wintering)*	High. Winters in shortgrass plains, plowed fields, open sagebrush, and sandy deserts. A large proportion of the North American wintering population occurs in the Imperial Valley with as many as 3,700 individuals occurring there (Patten et al. 2003; Shuford and Gardali 2008). The species does not breed in the region and is strictly present during the winter where it forages for invertebrates in barren fields, freshly plowed agricultural lands, and burned agricultural fields. CNDDB records within agricultural fields near the New and Alamo

Table 3.4-4 Special-Status Species Potentially Affected by the SCH Project

Common Name	Scientific Name	Status (Fed / State / CNPS)	Potential to be Present/Notes
			rivers. The species is nomadic and has also been recorded near the mouth of the New River and at Red Hill (Patten et al. 2003).
Western snowy plover (Interior populations)	*Charadrius alexandrinus nivosus*	– / SSC / – (breeding)*	High. Nests primarily in flat open areas, with sandy or saline substrates; less commonly in salt pans, dredged spoil disposal sites, dry salt ponds, and levees. Occurs year-round at the Salton Sea (Shuford and Gardali 2008).The Programmatic Environmental Impact Report (DWR and DFG 2007) noted this species uses the Salton Sea for breeding and wintering. Surveys estimated 221 breeding adults at the Sea in 1999 (Shuford and Gardali 2008). Observed during Summer 2010 surveys along the Sea's shoreline adjacent to Bruchard Bay (Dudek 2010).
Gull-billed tern	*Gelochelidon nilotica*	– / SSC / – (nesting)*	High. Forages over many habitats including fresh and saline emergent wetlands, lakes, mudflats, croplands, grasslands, and, rarely, brushlands. Nests in small colonies on the ground in areas typically devoid of vegetation; may nest immediately adjacent to the shoreline. Salton Sea is the only interior nesting site for gull-billed terns in western North America north of Mexico (Molina 2004).CNDDB records from 1994 and 1998 near the mouths of the Whitewater and Alamo rivers. Observed during Summer 2010 surveys at Sonny Bono NWR and at the USGS ponds near the Alamo River (Dudek 2010). Between 1992 and 2001 approximately 72 to 155 breeding pairs were present. Currently, approximately 65 to 200 breeding pairs are at the Salton Sea (personal communication, K. Molina 2010).
Black skimmer	*Rynchops niger*	– / SSC / (breeding)*	High. Breeds at the Sea's northern and southern ends with variable reproductive success (Shuford and Gardali 2008). Nest on the ground on sandy islands or sandy areas in salt marshes. Prefer islands with fine homogeneous substrates and no vegetation. The Salton Sea is the only interior nesting site for black skimmers in western North America north of Mexico (Molina 2004). Roosting takes place on sandy beaches or gravel bars. Rarely alights on water. Forage for fish by skimming the water surface. Observed during Summer 2010 surveys along the New and Alamo rivers and also nesting on the islands of Sonny Bono NWR (Dudek 2010).
Burrowing owl	*Athene cunicularia*	– SSC / – (breeding)*	High. Uses grassland, lowland scrub, agricultural fields, and other artificial open areas. Requires burrows or equivalent and friable soils. Often burrows into berms associated with irrigation ditches. Sizeable breeding populations are in agricultural areas in Imperial Valley (Shuford and Gardali 2008). Foraging areas typically include agricultural fields and grasslands. Observed several times near the Project area (Dudek 2010) including along Bruchard Road adjacent to Bruchard Bay and along Hatfield Road north of Estelle Road.
Gila woodpecker	*Melanerpes uropygialis*	– / E / –	Low. Cottonwood and other desert riparian trees, shade trees, and date palms. Cavity nester in riparian trees and saguaro cactus. Has been recorded as a breeding bird in Imperial and Coachella valleys and became established with the planting of large trees as the region was settled in the 1930s. It is rarely observed north of Calipatria but has been recorded at IWA's Wister Unit (Patten et al. 2003). The

Table 3.4-4 Special-Status Species Potentially Affected by the SCH Project			
Common Name	Scientific Name	Status (Fed / State / CNPS)	Potential to be Present/Notes
			species has been recorded anecdotally by birding groups such as Sea and Sage Audubon in 2009 and 2010; however, locations were not recorded (Sea and Sage Audubon 2010).
Little willow flycatcher	*Empidonax traillii brewsteri*	– / E / –	High. Riparian woodlands along streams and rivers with mature, dense stands of willows or alders; may nest in thickets dominated by tamarisk. Within the Project area, suitable habitat for the species includes tamarisk scrub and woodland. Most observations of the species are from mid-May through the first half of June. Salton Sea riparian areas may be important for migratory stopover. A total of 27 individuals were observed during 2010 surveys along both the New and Alamo rivers within tamarisk riparian habitat (Dudek 2010).
Crissal thrasher	*Toxostoma crissale*	– / SSC / – (year-round)*	Low. Uses dense thickets of shrubs or low trees in desert riparian and desert wash habitats; also, dense sagebrush and other shrubs in washes within juniper and pinyon-juniper habitats. Increasingly local and uncommon breeder in the Salton Sea area (Shuford and Gardali 2008). Suitable habitat within the Project area is desert riparian and wash habitats and could occur within the screwbean mesquite bosque or, less likely, within the tamarisk scrub and woodland. CNDDB records for the mouth of the Alamo River (1930, 1952, 1969), and in an upstream portion of the New River (Patten et al. 2003).
Loggerhead shrike	*Lanius ludovicianus*	– / SSC / – (breeding)*	High. Open ground including grassland, coastal sage scrub, broken chaparral, agricultural fields, riparian, open woodland. Fairly common at the Salton Sink during the breeding season and numerous in winter (Shuford and Gardali 2008). Suitable habitat within the Project area includes arrow weed thickets, desert holly scrub, iodine bush scrub, quailbush scrub, screwbean mesquite bosque, tamarisk scrub, and tamarisk woodland. Several individuals were observed on numerous occasions during Summer 2010 surveys (Dudek 2010) within tamarisk trees and mesquite adjacent to the Alamo River and most commonly adjacent to the Sea's shoreline within low stature tamarisk scrub or perching on dead snags while foraging.
Yellow-breasted chat	*Icteria virens*	– / SSC / (breeding)*	Moderate. Breed and forages within dense, relatively wide riparian woodlands and thickets of willows, vine tangles, and dense brush. The species was formerly a common breeding bird but fewer numbers are recorded in the past 10 years (Patten et al. 2003). Suitable habitat within the Project area includes the tamarisk scrub and woodland and screwbean mesquite bosque. In the 1990s up to six breeding pairs were known at four sites at the Salton Sea including at IWA's Wister Unit, two locations at the New River (near Brawley and Fig Lagoon), and the Whitewater River (Shuford and Gardali 2008). Observed during Summer 2010 surveys along the New River, potentially breeding (Dudek 2010).
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	– / SSC / – (breeding)*	Moderate. Nests in freshwater emergent wetlands with dense vegetation (cattails, common reed) and deepwater. Often along the borders of lakes or ponds. Common breeding bird at the Salton Sea (Patten et al. 2003). Observed on several occasions during the

Table 3.4-4 Special-Status Species Potentially Affected by the SCH Project

Common Name	Scientific Name	Status (Fed / State / CNPS)	Potential to be Present/Notes
			Summer 2010 surveys in marsh areas adjacent to the Alamo River and also while foraging within tamarisk or mesquite (Dudek 2010).
Large-billed savannah sparrow	*Passerculus sandwichensis rostratus*	– / SSC / – (nonbreeding)*	High. Saltmarsh, with pickleweed for breeding, and uses low shrub habitat dominated by iodine bush, saltbush, and young tamarisk during the nonbreeding season. Forages on barnacle beaches and rock outcrops at the shoreline. This subspecies is a fairly common post-breeding fall and winter visitor to the region occurring adjacent to the Sea's shoreline (Patten et al. 2003; Shuford and Gardali 2008). Observed at Obsidian Butte and near mouth of New River.
Mammals			
American badger	*Taxidea taxus*	– / SSC / –	Low. Dry, open treeless areas, grasslands, coastal sage scrub. It also occurs in drier open stages of most shrub, forest, and herbaceous habitat and especially requires friable soils for digging its burrows and foraging for its fossorial food. Although such habitat is not present within the Project area, very sandy friable soils are present along the New and Alamo rivers and the desert holly scrub, iodine bush scrub, quailbush scrub, and tamarisk scrub may provide the required habitat for this species if suitable soils are present. CNDDB record from 1937 within the Alamo River delta. No observations of the species or signs of foraging were observed in 2010 (Dudek 2010).
Western yellow bat	*Lasiurus xanthinus*	– / SSC / –	Low. Desert and montane riparian, desert succulent scrub, desert scrub, and pinyon-juniper woodland. Foraging may occur almost anywhere. Roosts in trees and primarily in palm trees; appears to prefer the dead fronds of palm trees. Could roost in tamarisk scrub and tamarisk woodland along the New and Alamo rivers. CNDDB record from 1976 southwest of the Whitewater River mouth and within the New River area near Brawley.

Notes:

* "Season of concern" as addressed for SSC species by Shuford and Gardali (2008)

Federal Designations:

D Delisted; monitored for 5 Years
E Endangered

State Designations:

SSC Species of Special Concern
FP Fully Protected Species
E Endangered
T Threatened
D Delisted

Plants

A search of the CNDDB for each of the United States Geological Survey (USGS) quadrangle maps within the study area and adjacent USGS quadrangle maps was conducted (CNDDB 2010) to determine a list of special-status plant species that could be affected by the SCH Project. All plant species that were state or

Federally listed in addition to plants on CNPS lists 1B (rare, threatened, and endangered in California and elsewhere) and 2 (rare, threatened, or endangered in California, but more common elsewhere) were included in this analysis (Appendix H). Each species was evaluated for likelihood of occurrence in the Project area and the necessity for conducting species-specific surveys. From this analysis, it was determined that no state or Federally listed or other special-status plant species are anticipated to occur within the area affected by the SCH Project. In addition, the likelihood of occurrence of other special-status plant species was so low as to make surveys unnecessary.

Aquatic Species

The only special-status aquatic species at the Salton Sea is the desert pupfish, which is also the only native fish in the Salton Sink. Desert pupfish are state and Federally listed as endangered, primarily as a result of habitat loss (e.g., dewatering of springs), pollution, and introduction of exotic species that either prey upon desert pupfish or compete for available resources (Marsh and Sada 1993).

Prior to formation of the modern Salton Sea, desert pupfish inhabited Salt Creek, San Felipe Creek, and several springs that were subsequently flooded by the Sea. Desert pupfish persist today in both creeks, as well as other tributaries to the Sea, and have become established in the terminal sections of agricultural drains that flow directly to the Salton Sea on the southern and northern shores, as well as in the Sea's shallow water margins. Desert pupfish are observed most frequently in shallow water less than about 1 foot (30 centimeters) deep with velocities less than about 1 foot/second (Black 1980, as cited in DWR and DFG 2007). They apparently are capable of moving freely between the relatively fresh water in the agricultural drains and the highly saline environment in the Salton Sea (DWR and DFG 2007).

Desert pupfish are very tolerant of extreme water quality conditions, and have been held in the laboratory in water with salinity greater than 98 ppt (Barlow 1958 as cited in Moyle 2002). The ability of desert pupfish to tolerate high salinity, high pH, and low DO apparently contributes to their ability to persist at the Salton Sea. Martin and Saiki (2005) suggested that desert pupfish abundance in Salt Creek and several agricultural drains is generally highest in areas where water quality extremes seemingly limit the occurrence of other fish. Currently, the relatively high salinity and water quality dynamics of the Salton Sea limit some of the fish that prey upon desert pupfish, especially now that the marine sport fish are apparently absent (DWR and DFG 2007).

Moyle (2002) summarized the life history of desert pupfish as follows, with additional information as noted. This species can tolerate salinities ranging from fresh water to considerably greater than seawater (up to 68 ppt in the wild), DO from saturation to as low as 0.1 to 0.4 milligrams per liter (=parts per million), and temperatures from 39.9 degrees Fahrenheit (°F) (4.4 Celsius [°C]) in winter (Schoenherr 1990) to 108.3°F (42.4°C) in summer (Carveth et al. 2006). Individuals can survive daily temperature fluctuations of up to 78.8°F (26°C) and salinity changes of 10 to 15 ppt. Desert pupfish tend to swim in groups called shoals that contain fish of similar size and age with smaller fish in shallower water than larger fish. In the Salton Sea, fish avoided high temperatures (above 36°C) by moving into deeper water during the warmer parts of the day. Pupfish feed on algae and small invertebrates on the bottom and ingest detritus as well. They occasionally feed on their own eggs and young. Desert pupfish grow rapidly, and some can reach maturity at a standard length of 0.6 inch (15 millimeters) although most do not breed until they reach 1.2 to 2.0 inches (30 to 50 millimeters) in length. Spawning occurs when temperatures are above 68°F (20°C), generally from April through October. Males are territorial during breeding and set up and defend territories for spawning. The eggs hatch in 10 days at 68°F (20°C). Larvae have a higher salinity tolerance (up to 90 ppt) than do adults (68 ppt) and can withstand sudden salinity changes of up to 35 ppt. Desert pupfish generally do not live more than 2 years.

Under current conditions at the Salton Sea, individual desert pupfish inhabiting creeks and drains that flow into the Sea are presumed to move along the Sea's margins and among drains. This movement provides the opportunity for genetic exchange among desert pupfish subpopulations and reduces the potential deleterious effects of isolation of individual populations. It also provides the opportunity to recolonize these same areas in the event a local population is extirpated (DWR and DFG 2007).

Under No Action, the Salton Sea would become too saline to support desert pupfish by about 2020. After that, desert pupfish would become isolated in the drains, creeks, and river outflows, which would prevent genetic exchange among the isolated populations and prevent recolonization following local extirpations.

Terrestrial Species

The species to be addressed in the impact analysis are listed in Table 3.4-4. Those described in greater detail below are located within or in close proximity to the Project area.

Western Snowy Plover. The western snowy plover is a small shorebird that regularly winters and breeds along the Sea's shoreline. The wintering population is the largest in interior western North America (Shuford et al. 2000). It nests during the spring and summer on open beaches with sand and barnacle substrates and in close proximity to standing water. The western snowy plover also forages along the Sea's shoreline, mostly on the sand and barnacle beaches. It will also forage in shallow impoundments with exposed mud. The Salton Sea is the most important wintering site for the western snowy plover in the interior of western North America, and the subspecies is more common year-round at the Sea than anywhere else within its range, except for the Great Salt Lake (Patten et al. 2003). Suitable habitat for foraging and breeding within the Project area includes the mudflats along the Sea's shoreline. In 2009, the western snowy plover was most abundant in February and occurred in smaller numbers in the winter and early spring (USFWS 2010b). Individuals currently forage in mudflat areas that surround Morton Bay, are along the edge of the Alamo River, are between Bruchard Bay and Unit 1, and are adjacent to the eastern side of the New River north to Young Road. Several individuals were observed during summer 2010 surveys along the shoreline adjacent to Bruchard Bay, but it was not confirmed that they were nesting (Dudek 2010). Nesting occurs within approximately 1,000 feet of the Sea's edge (personal communication, K. Molina 2010). Breeding has been noted to be concentrated on the Sea's western side from Desert Shores to the mouth of San Felipe Creek and on the eastern side from Bombay Beach to IWA's Wister Unit (Patten et al. 2003).

Little Willow Flycatcher. Willow flycatchers were observed between May and July in the Project area (Dudek 2010). They were generally observed within patches of tamarisk that were more than just a linear string of trees along the New and Alamo rivers within the survey area of each river as well as in a patch of habitat located south of the New River. No willow flycatchers were observed during the third survey period of the focused survey protocol (Sogge et al. 2010). Thus, it was concluded that the observed willow flycatchers were not the southwestern willow flycatcher subspecies, which is Federally listed as endangered. It was concluded that the subspecies observed is not breeding within the study area. The willow flycatcher that was observed during this focused survey could be either one of the other subspecies of willow flycatcher that breed elsewhere. Based on the discussion of the occurrence of the various subspecies of willow flycatcher in Patten et al. (2003) and the dark plumage of the individuals that were detected, the subspecies occurring in this region is likely the little willow flycatcher (*E. t. brewsteri*) (Patten et al. 2003). In support of this conclusion, the southwestern willow flycatcher does not normally stop while migrating between its nesting locations and the international border; hence, it would be unlikely to occur within the Project area (Patten et al. 2003). The region may be an important winter stopover location for the little willow flycatcher subspecies because it has been documented to be the most common flycatcher migrant in the Salton Sea region (Patten et al. 2003).

Gull-Billed Tern. Gull-billed terns nest on protected spits, berms, and islands composed of sand or barnacle shells; at the Salton Sea, they also nest on earthen levees and on constructed islands in shallow brackish impoundments. For Salton Sea colonies, available nesting substrates include fine, poorly drained, clay soils devoid of all vegetation with cobbles and boulders located sparsely. Nests are often located adjacent to cobbles, boulders, or other debris. Gull-billed terns forage primarily in freshwater ponds and flooded agricultural fields. They are fairly common breeders at the Salton Sea, which is considered the breeding stronghold for this species in the western United States. Approximately 25 percent of the entire subspecies nests at the Salton Sea; approximately 80 percent of the U.S. population breeds at Salton Sea (Molina 2004). They arrive at the Salton Sea in mid-March and remain until October. Foraging habitat within the Project area would likely include agricultural fields, marshes, mudflats, drainage ditches, and fresh or saline open water. At the Salton Sea, the species forages for small fish, crayfish, lizards, butterflies, beetles, crickets, weevils, and occasionally, the young chicks of other birds. In 1999, 101 nesting attempts were recorded, 57 on the Sea's northern end near Johnson Street and 44 at Rock Hill on the southern shore (Shuford et al. 2000). In 2009, gull-billed terns were observed between April and July within the Project region and were most abundant in July with almost 200 individuals recorded, predominantly at Morton Bay and Mullet Island (personal communication, K. Molina 2010).

Yuma Clapper Rail. While the other clapper rail subspecies are species of tidal marine estuaries, the Yuma clapper rail occurs in heavily vegetated freshwater marshes with nearly monotypic patches of cattail, but also may occur in dense stands of common reed where it forages primarily for crayfish. This subspecies breeds only in the lower Colorado River Valley and in the Salton Sink, which supports approximately 40 percent of the U.S. population (Shuford et al. 2000). Suitable habitat within the Project area includes cattail marsh and common reed marsh. Scattered locations of the Yuma clapper rail are known north of the Project area near the Whitewater River delta, and a CNDDB record exists from 1990 northeast of the Alamo River confluence. More recently, the principal locations are IWA's Wister Unit, Unit 1 of Sonny Bono NWR, and the marshes around the New and Alamo rivers. The 2009 marsh surveys conducted by Sonny Bono NWR detected a total of 96 Yuma clapper rails (USFWS 2010b). Approximately 26 were recorded in the Hazard Ponds, 1 was recorded at the Alamo River, 1 was recorded at Union Pond, 4 were detected at Bruchard Bay, approximately 30 were recorded in Unit 1, and approximately 25 were detected in the Reidman and Trifolium locations. On IWA's Wister Unit, 191 birds were detected in 2009; however, detailed mapping was not provided. In 2010, 132 locations had positive detections on the Wister Unit (DFG 2009; DFG 2011b). Over one-half of these positive locations were north of Beach Road, 6 were south of Beach Road and west of Davis Road, and 12 were between Noffsinger Road and Alcott Road. During summer 2010 surveys, the Yuma clapper rail was detected twice near the Alamo River mouth (Dudek 2010).

Black Skimmer. Black skimmers are relatively recent arrivals to California and were first observed at the Salton Sea in 1968. They are now a fairly common breeder at the Sea with approximately 40 percent of the California breeding population (Ornithological Council 1988). The Sea is the only interior nesting site for black skimmers in western North America north of Mexico (Molina 2004). They seldom overwinter. They typically nest on sandy islands or sandy areas in salt marshes and they can also nest on isolated sections of eroded impoundment levees. Nesting habitat usually has little vegetative cover (<30 percent) with adequate protection from predators; areas with encroaching vegetation were rendered unsuitable for nesting. Shallow water near nest sites is required to soak their bellies to aid in cooling their eggs. Colonies choose areas where the chance of terrestrial predators is minimal. Black skimmers forage on small fish in calm, shallow waters around the Sea. From 1990 to 2000, the Salton Sea breeding population ranged between 80 and 487 pairs, with a mean of 360 pairs between 1992 and 2001. In 1999, 377 breeding pairs were recorded at Rock Hill at the Sea (Shuford et al. 2000). They also nest at the Sea near the Whitewater River delta, various locations on the southern shoreline, and near Salton City. In 2009, black skimmers were observed between May and October and were most abundant in August with approximately 150 individuals recorded near and within the Project area (USFWS 2010b). Near the Project area, this species has been recorded breeding at Sonny Bono NWR. Colonies usually include approximately 50 nests. Suitable breeding areas within the Project area for this species include Mullet Island and sandbars. They seldom overwinter.

California Brown Pelican. The California brown pelican occurs at the Salton Sea as newly fledged young and post-breeding adults as they disperse from nesting areas in Baja California. During summer, brown pelicans forage around the Sea's margin. Since the mid 1990s, single day counts have reached 2,000 individuals (Shuford et al. 2000) and probably exceed 3,000 (Patten et al. 2003). Peak numbers of brown pelicans detected during surveys in 2005 and 2006 were over 5,000 birds (DWR and DFG 2007). In recent years, brown pelicans have nested in small numbers, especially at the Sea's southern end at the mouth of the Alamo River (Molina and Sturm 2004). In 2009, California brown pelicans were most abundant in August with almost 3,000 individuals recorded near and within the Project area; numbers declined in the fall but the species remained a consistent visitor throughout the year (USFWS 2010b). This species was observed during summer 2010 surveys foraging within the Sea at the mouths of the New and Alamo rivers and along the shoreline (Dudek 2010); suitable roosting and loafing habitat includes sandbars, islands, and rocky areas within the Project area.

3.4.4 Impacts and Mitigation Measures

3.4.4.1 Impact Analysis Methodology

Impacts on biological resources were assessed in several ways. Direct effects on special-status species, riparian areas, wetlands, and colonial bird nesting were evaluated by estimating the amount of habitat that could be affected by Project construction activities and comparing it to the amount of that habitat present in the area. The seasonal abundance of special-status species and their use of the affected habitat were also considered in the analysis. In addition, the effects of noise, human presence, lighting, turbidity, and other construction-related disturbances were assessed through scientific judgment of the preparers, unless specific tolerances of individual species were known. Effects of Project construction on wildlife movement or migratory corridors was qualitatively evaluated based on known or expected movement pathways and Project information. Impacts of Project operation and maintenance were assessed by evaluating how planned activities could interact with anticipated development of biological resources in the restored habitat, or could change exposure to contaminants such as selenium and pesticides. A desktop analysis of wetlands and other Waters of the U.S. was conducted by overlaying project vegetation maps and maps of pond locations along with assumptions of additional areas that would be disturbed, such as diversions in rivers. For the purpose of this analysis, areas mapped as marsh were assumed to be wetlands and areas mapped as open water were assumed to be Waters of the U.S.

3.4.4.2 Thresholds of Significance

Significance Criteria

Impacts would be significant if the Project alternatives would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as listed (or proposed or candidate) as threatened or endangered by the DFG or USFWS, or identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the DFG or the USFWS;
- Have a substantial adverse effect on Federally protected wetlands as defined by CWA through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife breeding or nursery sites;

- Have a substantial adverse effect on common native plant communities, fish (native and nonnative), or wildlife species either directly or through habitat modification;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved, local, regional, or state habitat conservation plan.

Application of Significance Criteria

The following summarizes the overall methodology used in applying the applicable significance criteria to the Project alternatives:

- **Substantially affect special-status species, riparian habitat, or wetlands** – The Project footprint was overlaid onto GIS maps of these biological resources to determine the amount of habitat affected. For effects of construction activities (e.g., noise, lighting, turbidity) on special-status species, a buffer around the Project footprint of 500 feet was used. No special-status plant species occur in the Project footprint or surrounding buffer area and, therefore, no impacts on those species would occur. For this reason, special-status plant species are not discussed in the following impact analysis.
- **Substantially interfere with wildlife movement or breeding/nursery areas** – Known or anticipated movement corridors for fish and wildlife were compared to locations of Project features and activities (construction and operation/maintenance) to determine potential for interference with movement. For impacts on breeding/nursery areas, the Project footprint was overlaid on a map of known locations for these areas.
- **Substantially affect native plant communities, fish (native and nonnative), or wildlife species** – Known locations of native plant communities and wildlife (excluding special-status species, wetlands, and riparian habitats) were identified on Project maps, and the potential for a substantial effect was assessed qualitatively for fish and wildlife and quantitatively for plant communities. Selenium's pathways and concentrations were modeled to assess impacts on birds (Sickman et al. 2011; Appendix I, Selenium Management Strategies). Pesticide concentrations in sediment were measured at different depths (Wang et al. 2011; Appendix J, Summary of Special Studies), and site-specific concentrations were calculated for each alternative (Cardno ENTRIX 2011, unpublished data). The calculated concentrations were then compared to sediment screening criteria for protection of the invertebrate community (MacDonald et al. 2000, CRBRWQCB 2010) as well as individual adult birds and eggshell thinning (Poulsen and Peterson 2006) to assess potential ecological impacts.
- **Conflict with local policies or ordinances –** Compliance with the local policies and ordinances is discussed under land use and, therefore, is not considered in this section.
- **Conflict with an approved HCP or NCCP –** IID is in the process of developing an HCP and NCCP covering water conservation activities and delivery and drainage of irrigation water within portions of its service area in Imperial Valley. This plan is not yet approved, and no other HCPs or NCCPs apply to the Project area. Because no approved plans are in place, this criterion was not addressed in the impact analysis.

3.4.4.3 No Action Alternative

Habitat Changes

Under the No Action Alternative, a number of physical and chemical habitat changes would occur in the Project area between 2010 and 2025, and beyond. Physical changes include loss of islands and snags, a reduction in amount of shoreline, and decreased water depth in the Salton Sea. The primary chemical change will be the continued increase in the Sea's salinity. Both the physical and chemical changes will alter the biological resources present.

As described in the Programmatic Environmental Impact Report (DWR and DFG 2007), a number of activities would occur at the Salton Sea from 2010 to 2025 unrelated to the SCH Project. Sedimentation/distribution basins, air quality management measures, and pupfish channels would be constructed, operated, and maintained. The pupfish channels would allow them to move between the drains until conditions in the Sea can no longer support desert pupfish. Under the QSA and California Fish and Game Code, IID must convey water into the Salton Sea until 2017 to mitigate some of the adverse impacts caused by transfer of water from IID to San Diego County Water Authority. Until 2018, surface water elevations in the Salton Sea would decline due to factors unrelated to the QSA from the existing elevation of about -228 feet msl to -235 feet msl, and salinity would continue to increase from the current level of about 51 ppt to 60 ppt. After 2018, inflows and the Sea's surface water elevation would decline more rapidly and salinity would increase. By 2078, the water elevation would be about -260 feet msl and salinity would exceed 300 ppt. The surface water area would decline from the existing 230,000 acres to 213,000 acres in 2018 and 140,000 acres by 2078, resulting in a substantial decrease in the amount of shoreline habitat. The drains and river outflows would extend across the exposed Seabed to reach the receding Sea.

Vegetation

Upland vegetation adjacent to the existing Salton Sea would change very little under the No Action Alternative. As the Sea recedes, plants such as tamarisk, salt bush, iodine bush, and other salt-tolerant species would likely sparsely colonize the exposed Seabed. Air quality management activities, however, would likely establish vegetation to stabilize the exposed sediments. Outflows from drains and rivers would create channels that extend across the exposed bed to the Salton Sea, and vegetation would establish along these channels. The types of plant communities that establish along these channels would depend on species tolerance to salinity and are expected to consist of tamarisk and common reed along the rivers and tamarisk or cattails along the drains.

Aquatic Biota

The Sea's changing chemical characteristics, and particularly the increasing salinity, would affect planktonic organisms and benthic invertebrate communities from phytoplankton to larger organisms. As the salinity tolerance level for individual species is exceeded, those species would die out until only species with higher tolerances remain. Thus, the species composition and abundance of common phytoplankton and invertebrates would change over time. Phytoplankton, and to a greater extent invertebrates, provide forage for fish and some species of birds. Changes in species composition and abundance of these organisms could affect food availability for at least some species of birds if their preferred food is no longer available.

Fish populations in the Sea would change with increasing salinity. Tilapia would no longer be present in large numbers when salinity exceeds 60 ppt (prior to 2020). Small numbers, however, are likely to remain in less saline water where drains and the rivers enter the Sea. They would also continue to be present in the drains. Although tilapia are an introduced species that is not native to this region, a substantial reduction in their population would cause a substantial effect on the Sea's bird use. Sailfin mollies could persist in the Sea until salinity reached about 87 ppt (Moyle 2002), if other water quality parameters remain within their tolerance. Freshwater fish populations in the New and Alamo rivers, as well as in the drains, would show little change. These species would also be present in the pupfish channels and sedimentation/distribution basins.

Desert pupfish would remain in the Sea until salinity exceeds approximately 68 ppt (in about 2025) and then would be restricted to the drains and tributaries where present at that time. This restriction would result in isolation of populations and loss of habitat.

Wildlife

The decline and ultimate loss of open water fish populations, and particularly tilapia, would reduce and possibly eliminate use of the Salton Sea by piscivorous birds such as pelicans, double-crested cormorants, and black skimmers by the early 2020s. Some of these birds could use areas where the rivers, creeks, and drains enter the Sea if fish continue to persist in these locations, as well as the sedimentation/distribution basins. The number of species and relative abundance of individuals that forage on invertebrates at the Sea likely would change over time as a result of changes in the invertebrate community.

Snags used for bird roosting and nesting in the Salton Sea would disappear by 2020 as the Salton Sea recedes and the snags break and collapse due to degradation by wind, brine, and time. Mullet Island would cease to be protectively surrounded by water. The loss of snags and Mullet Island could limit nesting opportunities for several species of colonial nesting birds, including herons and egrets.

As the Salton Sea recedes in future years, the distance between the shoreline and freshwater wetlands (Sonny Bono NWR, IWA, and duck clubs) and agricultural lands adjacent to the present Salton Sea would increase, possibly changing the level of bird use at the Sea. Air quality management activities would increase human presence in areas where vegetation is planted and maintained, which could disturb shorebirds adjacent to the work areas. Use of equipment for air quality management could startle birds using the shoreline and open water, resulting in stress and expenditure of energy.

Contaminants

Selenium occurs in the Salton Sea's water and sediment, and has the potential to bioaccumulate and adversely affect fish and wildlife (DWR and DFG 2007), as discussed in Appendix I, Selenium Management Strategies. Selenium's most substantial effects occur in bird embryos, such as increased risk of reduced hatching success and teratogenesis (embryo deformities) at higher concentrations. The responses to selenium vary among bird species, ranging from "sensitive" (e.g., mallard) to "average" (e.g., black-necked stilt) and "tolerant" (e.g., avocet) (Skorupa 1998, as cited in Ohlendorf and Heinz 2011). Cormorants and terns are likely to be fairly tolerant of selenium in keeping with greater tolerance of other saltwater-adapted species, such as avocets and snowy plover, compared to freshwater-adapted species, such as mallards (personal communication, H. Ohlendorf 2010). Risk of impaired reproduction can start to occur at egg concentrations of 6-12 micrograms per gram (µg/g) dry weight (dw). The risk of teratogenesis starts to occur above 12 µg/g dw for sensitive species and above 20 µg/g dw for moderately sensitive species (Ohlendorf and Heinz 2011).

Under the No Action Alternative, selenium concentrations in bird eggs in the area would be similar to existing levels in the area. Mean concentrations measured in eggs from several sites varied: Salton Sea shallow water and estuary sites (means 2.8-5.98 µg/g dw [range 1.9 - 14.2 µg/g dw]), a freshwater marsh northeast of Morton Bay near Pound Road (means 5.6-7.05 µg/g dw), and Sonny Bono NWR (means 2.18-4.42 µg/g dw) (DWR and DFG 2007, Appendix F; Miles et al. 2009). A large percentage (39 percent) of eggs from the freshwater marsh site and Morton Bay exceeded 6 µg/g dw, but these egg selenium concentrations apparently did not affect embryo malpositioning in such a way that would affect hatchability (Miles et al. 2009).

Other contaminants of concern are pesticides, and organochlorine pesticides are the predominant type in sediments near the Alamo and New rivers (see Section 3.11.3.2, Surface Water Quality; Wang et al. 2011; Appendix J, Summary of Special Studies). The concentration of most pesticides was well below detectable levels, but dichlorodiphenyltrichloroethane (DDT) and its metabolites represented more than 80 percent of the total concentration of organochlorine pesticides detected in Salton Sea sediments, with dichlorodiphenyldichloroethylene (DDE) as the most abundant derivative. Because the use of DDT has been banned in the U.S. for decades, these are assumed to be legacy contaminants.

Of the current-use pesticides evaluated, bifenthrin was the most commonly detected pyrethroid and was found at concentrations up to 26 nanograms per gram (ng/g) (Wang et al. 2011). Some of the air-exposed sediments contained bifenthrin at levels exceeding the 10-day median lethal concentration for *Hyalella azteca* (an aquatic isopod) of 4.5 ng/g dw. However, based on the relative sensitivity of *H. azteca* to pyrethroid exposure, the potential toxicity of these sediments to the invertebrate taxa that occur in the Salton Sea is likely overestimated (Ding et al. 2010).

Current DDE concentrations in surface sediments (0 to 5 centimeters deep) represent undisturbed existing conditions and the No Project Alternative. Mean DDE concentrations in these sediments were 1.14 to 6.52 ng/g near the New River and 13.41 to 13.66 ng/g near the Alamo River (Table 3.4-5). Organochlorine pesticide concentrations showed a pattern of decreasing concentration with distance from the river mouths. The highest surface sediment DDE concentrations were found at the Alamo River sites, and lowest were at the New River Far West sites. Sediment DDE levels observed at the proposed SCH sites fall within the range of values observed in the region: 4 to 48 ng/g at the SHP (saline habitat ponds) and 2 to 98 ng/g for reference habitats in the southern Salton Sea area (Miles et al. 2009).

Table 3.4-5 Estimated Sediment DDE Concentrations (ng/g) for Existing Conditions/No Action and SCH Project Alternatives

		Existing Conditions and No Action[1]		SCH Project[2]		Difference between Existing/No Action and Project	
Alternative	Pond units	Mean	Maximum	Mean	Maximum	Mean	Maximum
1	New East	6.5	23.7	7.2	28.0	0.7	4.3
	New Middle	2.8	8.0	3.5	14.7	0.7	6.7
2	New East	6.5	23.7	7.1	27.6	0.6	3.9
	New Middle	2.8	8.0	3.6	15.7	0.8	7.7
	New Far West	1.7	2.9	1.0	2.7	-0.7	- 0.2
3	New East	6.5	23.7	7.1	27.9	0.6	4.2
	New Middle	2.8	8.0	3.5	14.7	0.7	6.7
	New Far West	1.7	2.9	1.1	2.7	-0.6	- 0.2
4	Alamo Morton Bay	13.7	32.4	15.7	45.0	2.0	12.6
5	Alamo Morton Bay	13.7	32.4	19.2	66.6	5.5	34.2
	Alamo - north	13.4	34.4	12.9	34.8	- 0.5	0.4
6	Alamo Morton Bay	13.7	32.4	17.7	57.3	4.0	24.9
	Alamo - north	13.4	34.4	12.9	34.8	-0 .5	0.4

1. DDE concentrations (mean and maximum values) in undisturbed surface sediments (0 to 5 centimeters deep) measured at each location (Amrhein and Smith 2011; Wang et al. 2011)

Table 3.4-5 Estimated Sediment DDE Concentrations (ng/g) for Existing Conditions/No Action and SCH Project Alternatives

		Existing Conditions and No Action[1]		SCH Project[2]		Difference between Existing/No Action and Project	
Alternative	Pond units	Mean	Maximum	Mean	Maximum	Mean	Maximum

2. Expected (calculated) DDE concentrations for each SCH alternative, based on field measurements of surface sediments (0 to 5 centimeters) and subsurface sediments (5 to15 and 15 to 30 centimeters deep) (Wang et al. 2011), and weighted according to proportion of pond area that would remain undisturbed but inundated (surface 0- to 5-centimeter concentrations) and area disturbed by construction [borrow ditches for berms, excavated swales and channels, borrow for habitat islands) (subsurface 5- to 30-centimeter concentrations)]. "Mean" is the area weighted average calculated using mean values for surface and subsurface sediments. Because DDE concentrations below 30 centimeters are unknown and construction could disturb deeper sediments, hypothetical "maximum" concentrations were also calculated using maximum observed values of surface and subsurface sediments, as a hypothetical upper bound of potential risk.

The scientific and regulatory literature was reviewed and evaluated to determine appropriate ecotoxicological screening criteria for DDE in sediment and biota. The first tier screening criterion (31.3 ng/g DDE) is a Probable Effects Concentration (PEC) for general ecotoxicity based on sediment guidelines established by the Colorado River Basin Regional Water Quality Control Board (CRBRWQCB 2010 based on MacDonald et al. 2000) to prevent direct toxicity to the macroinvertebrate population, which serves as a food base for fish and insectivorous birds. The second tier screening criteria address potential risk of DDE bioaccumulation in birds and their eggs. These sediment bioaccumulation Screening Level Values (SLVs) are 0.55 ng/g for protection of adult fish-eating birds (herons) and 0.17 ng/g for protection against eggshell thinning in raptors (osprey) (Poulsen and Peterson 2006). A comparison of the SLV criteria to the values in Table 3.4-5 shows that existing sediment concentrations of DDE are already at levels that pose a risk for bioaccumulation that could cause adult toxicity or eggshell thinning as a result of the long-term legacy of agricultural runoff.

Finally, DDE concentrations in black-necked stilt eggs at the Salton Sea have been measured (Miles et al. 2009). These researchers cited 4.0 µg/g wet weight (ww) (Henny and Herron 1989, as cited by Miles et al. 2009) as a threshold for observed eggshell thinning in aquatic birds, and 1.7 µg/g ww (Henny et al. 2008, as cited by Miles et al. 2009) as a level at which eggshell thinning in stilt eggs was not observed at the SHP. The proportion of stilt eggs that exceeded the 1.7 µg/g p,p'-DDE value was 44 percent at the SHP, 29 percent at Freshwater Marsh/Morton Bay, and 21 percent at D-Pond/Hazard. By contrast, only 18 percent of the SHP eggs, 3 percent of the Freshwater Marsh/Morton Bay eggs, and 7 percent of the D-Pond/Hazard eggs exceeded 4.0 µg/g. Although stilt eggs are not necessarily reflective of the entire avian community, these observations give some indication that, in spite of elevated DDE levels in Salton Sea sediments, DDE concentrations in bird eggs do not pose a high potential for eggshell thinning.

Total DDT (includes dichlorodiphenyldichloroethane [DDD] and DDE) concentrations in fish tissue were measured around the Salton Sea by the State Water Resources Control Board Toxic Substances Monitoring Program (1978-1995) for use in developing sedimentation/siltation Total Maximum Daily Load guidance for New and Alamo rivers (CRBRWQCB 2002a and 2002b) and IID drains that empty directly into the Salton Sea (CRBRWQCB 2005). Mean total DDT fish tissue concentrations were 2,816 micrograms per kilogram (µg/kg) ww in the Alamo River (27 samples, representing 137 individual fish) (CRBRWQCB 2002a); 1,090 µg/kg in the New River (34 samples, representing 176 individual fish) (CRBRWQCB 2002b); and 97 µg/kg ww for Salton Sea fish (21 samples, representing 102 individual fish) (CRBRWQCB 2005). Poulsen and Peterson (2006) developed acceptable fish tissue levels of DDT, DDD, and DDE for protection of adult bird populations (150 µg/kg ww) and for protection against eggshell thinning in raptor populations (41 µg/kg ww). Therefore, fish tissue concentrations measured in the Salton Sea and the New and Alamo rivers are already at levels that have the potential for avian toxicity and eggshell thinning.

Under the No Action Alternative, DDE concentrations would remain and slowly decrease over time due to chemical and biological breakdown of this pesticide. Bifenthrin and other current use pesticides would continue to enter the Salton Sea via the agricultural drains and rivers. Effects of these chemicals on aquatic biota and the food web at the Salton Sea are unknown.

3.4.4.4 Alternative 1 – New River, Gravity Diversion + Cascading Ponds

Impact BIO-1a: Project construction and operation would affect habitat and individuals of desert pupfish and several special-status bird species (significant impact).

Desert Pupfish

Because desert pupfish are or could be present in agricultural drains and in shallow water along the Sea's shoreline, construction activities for the ponds and diversion of the drain outflows around the Project area would result in habitat loss, alteration of adjacent habitat through turbidity, and mortality of some individuals. If construction activities occurred during the desert pupfish breeding season (approximately April through October), reproductive success for those mature pupfish in the Project footprint could be greatly reduced. Since the species generally does not live more than 2 years, loss of reproduction for 1 year could have substantial effects on the population size at a specific location. Construction of the pump stations and pipeline for bringing saline water from the Salton Sea to mix with the river water for salinity control in the ponds would be from a barge and the adjacent berm and would temporarily affect a small area of the Sea, primarily through underwater sound and turbidity. Few, if any, desert pupfish would be affected by this construction activity. As the Sea recedes, the outer pump station would need to be moved, or another one built, and the pipeline extension placed on or within the exposed Seabed. By that time, salinity in the Sea would exceed the tolerance of desert pupfish, and construction would not affect them.

The Project would result in a permanent isolation of existing shallow shoreline habitat (approximately 6.3 miles) where the ponds are constructed compared to current conditions. Pupfish, however, would still be able to move around (outside) the ponds via the Sea until salinity exceeds their tolerance in about 2020. Although the SCH ponds are not specifically designed or intended to provide pupfish habitat, the shallow water within them would be suitable habitat, and some pupfish are likely to be trapped in the ponds during construction if the downslope (offshore) berms are installed "in the wet" rather than on the exposed playa. These pupfish would likely persist due to the proposed water quality for the ponds but would be isolated (physically and genetically) from those in the Salton Sea and its connected waters. Isolation of populations in the drains and tributaries also would occur in approximately 2020, making the Project isolation temporary compared to future conditions (No Action Alternative). Additional pupfish may be introduced into the ponds once they are completed, particularly prior to that time when the Sea becomes too saline for them to survive in the Sea, which would increase the genetic pool in the ponds. The ponds would overflow directly into the Sea, and pupfish could enter that overflow. When the Sea's salinity or water quality exceeds their tolerance, any desert pupfish entering the overflow would be killed.

Water from existing agricultural drains that discharge to the Sea where the ponds would be built would be diverted around the ponds by new interception ditches to the east and west. Habitat used by pupfish in those drains would remain, but the individual drain connections to the Sea would be combined into two connections, thereby resulting in a greater distance for desert pupfish to traverse in the Sea between the new (combined) drain outlets. Construction of the new drain interception ditches would disturb existing pupfish habitat at the mouth of the drains and could disrupt spawning, depending on time of year, or result in injury or mortality of individuals. The new drain interception ditches, once completed, would provide habitat for desert pupfish, but maintenance of these channels would cause periodic disturbance within that habitat and could result in disturbance to spawning or mortality of some individuals. Compared to the No Action Alternative, the Project would result in a temporary loss of shallow shoreline habitat (approximately same amount as current conditions), but as the Sea recedes, that shallow habitat would move seaward beyond the ponds and become available again until salinity exceeds the tolerance level for desert pupfish in about 2020.

Operation of the pump stations to bring saline Water to the ponds has the potential to entrain desert pupfish until the Sea becomes too saline for their survival. The intake would be screened until that time, and maintenance activities to clean or to replace the screen could affect pupfish in the intake's immediate vicinity. Maintenance of the pump stations could result in release of lubricants or other chemicals potentially toxic to pupfish. Due to the proposed location of the pump stations (adjacent to the outer berm and offshore from the ponds), few desert pupfish are likely to be affected by maintenance activities.

Maintenance activities for the ponds also could affect desert pupfish that are present in the ponds. Turbidity effects, disturbance of feeding and spawning areas, and direct mortality could occur. Dropping the water level of one or more ponds for maintenance could strand desert pupfish resulting in mortality from desiccation or predation by birds. Under an emergency situation, draining one or more of the ponds for maintenance could occur and would strand desert pupfish resulting in mortality from desiccation or predation by birds.

Overall, Alternative 1 would have significant impacts on desert pupfish when compared to both the existing environmental setting and the No Action Alternative.

Bird Species

Construction as well as operation and maintenance activities could affect special-status bird species that are present within the Project footprint through direct habitat disturbance, noise, and human presence. Individuals immediately adjacent to Project activities could also be affected by noise. Noise has been documented to adversely affect avian reproduction, and thus, construction noise and activity, if adjacent to areas occupied by nesting birds, could result in nesting failure if such activities occur during the breeding season.

Burrowing Owl. Because the burrowing owl is or could be present along the drains and berms, construction of the interception ditches and the gravity diversion pipeline and sedimentation basin could result in burrow loss and mortality of some individuals. If construction activities occurred during the burrowing owl breeding season (February through August), burrowing owl adults, eggs, or young could be trapped or killed by grading or excavation activities. Construction noise and activity, if adjacent to areas occupied by nesting burrowing owls, could result in nesting failure. If construction activities occurred during the burrowing owl wintering season and burrowing owls occupied a burrow within the construction area, the adults may be trapped, injured, or killed. Once construction was completed, burrowing owls could reestablish use of the area disturbed. No permanent loss of habitat would occur. Construction effects would be the same under both the existing environmental setting and the No Action Alternative.

Maintenance of Project roads, pond berms, and sedimentation basins could temporarily affect burrowing owl nesting or wintering as described for construction.

Overall, Alternative 1 could have significant impacts on burrowing owls when compared to both the existing environmental setting and the No Action Alternative.

California Black Rail and Yuma Clapper Rail. Because California black rail and Yuma clapper rail are or could be present within freshwater marsh habitat along the drains or within freshwater marsh habitat immediately adjacent to the Project footprint, Project construction activities could result in habitat loss, injury or mortality of individuals, or disruption of breeding. The Project could result in a loss or disturbance of suitable freshwater marsh habitat if it is present within the drain mouths that would be diverted around the Project area. Construction noise and activity, if adjacent to areas occupied by California black rail or Yuma clapper rail, such as within Bruchard Bay, Trifolium 1, or other marshes in Unit 1, could result in nesting failure if such activities occur during the breeding season (March through August). Due to the low population size of these species, any loss of individuals or their annual reproduction could adversely affect the population size.

Operation of the interception ditches, particularly in NWR Unit 1 (southwest of the New River), could reduce the amount of water in adjacent marshes such as Bruchard Bay through interception of subsurface flow. Loss or alteration of marsh habitat could affect California black rail or Yuma clapper rail breeding. Maintenance of the drain interception ditches would have the potential to affect breeding of these species if marsh vegetation develops in the channels, is colonized by either species, and is cleared during the nesting season.

Overall, Alternative 1 could have significant impacts on California black rail and Yuma clapper rail when compared to the existing environmental setting and the No Action Alternative, primarily from maintenance of the drain interception ditches, if colonized.

Other Nesting Marsh Bird Species. Redhead, least bittern, and yellow-headed blackbird are or could be present in freshwater marsh habitat as breeding birds within the Project area if freshwater marsh habitat is present within the drains that would be affected. Construction noise and activity could result in habitat disturbance or loss as well as nesting failure during the breeding season (April through August). Because these species would not be present in the Salton Sea, impacts under the existing environmental setting and the No Action Alternative would be the same. Any loss of nesting birds would be considered a significant impact.

Operation of the interception ditches could affect adjacent marsh nesting habitat as described for the black rail and Yuma clapper rail. Maintenance of the drain interception ditches would have the potential to affect breeding of these species if marsh vegetation develops in the channels, is colonized by these species, and is cleared during the nesting season.

Overall, Alternative 1 could have significant impacts on redhead, least bittern, and yellow-headed blackbird when compared to the existing environmental setting and the No Action Alternative.

Western Snowy Plover. Because western snowy plovers are or could be present nesting and wintering along the shoreline and foraging in shallow water along the Sea's shoreline, construction activities for the ponds and drain interception ditches around the Project area could result in habitat loss and mortality of some individuals. Pond construction (primarily berm on the landward side of the ponds) would cause a small loss of foraging habitat for the western snowy plover, but other foraging habitat would remain outside the Project footprint. If construction activities were to occur during their breeding season (March through August), reproductive success for those snowy plovers in the Project footprint could be greatly reduced through the destruction of nests and nest abandonment by adults due to noise and human activity. Due to the relatively small population in the region, loss of reproduction for a portion of the breeding population at the Salton Sea for up to 2 years could have substantial effects on the population size.

The Project would result in a permanent disturbance or loss of shallow shoreline habitat (approximately 6.3 miles) where the ponds are constructed compared to current conditions. The loss could also include flooding of currently exposed shorelines along the bay on the eastern side of the New River. Western snowy plovers would still be able to move around (outside) the ponds and nest and forage along the Sea's other shoreline areas. Although the SCH ponds are not specifically built for western snowy plovers, the shallow water and shoreline within them could provide suitable foraging habitat upon completion of construction. Suitable nesting habitat and foraging opportunities may also be present where not covered by shoreline protection (e.g., riprap). However, the low berm (approximately 2 feet high) with its associated road along the landward side of the ponds could eliminate or alter shoreline habitat used by western snowy plovers for resting and nesting. Compared to the No Action Alternative, the Project would result in a temporary loss of shoreline habitat (approximately same amount as current conditions) until the Sea recedes beyond the SCH ponds.

Maintenance activities along the shoreline of the ponds may result in impacts on western snowy plover nesting, if maintenance takes place during the breeding season and if the species nests within the Project area.

Overall, Alternative 1 would have significant impacts on snowy plover when compared to the existing environmental setting and the No Action Alternative.

Riparian Bird Species. Because white-tailed kite, little willow flycatcher, yellow-breasted chat, gila woodpecker, and crissal thrasher are or could be present in riparian habitat along the New River within the SCH pond area or upstream along the conveyance pipeline route, construction activities for the river diversion and conveyance pipelines as well as the berm improvement and road construction along both sides of the river between the ponds could result in riparian habitat loss or disturbance that could cause failure of nesting and possible mortality of some individuals. While loss of habitat is anticipated to be minimal, noise and human activity immediately adjacent to the riparian corridor could adversely affect breeding for any individuals present in that area if construction activities occur during the riparian bird breeding season (April through September). Impacts would be the same compared to the No Action Alternative and existing conditions.

Maintenance activities could result in a minor amount of riparian habitat loss or disturbance at the diversion location and where the river and Sea water pipelines enter the ponds. During the breeding season, maintenance activities could result in nesting failure and possible mortality of a few individuals, primarily nestlings. Maintenance of and driving along the river berms during the nesting season could have similar impacts. This impact is anticipated to be minimal and could be avoided by timing maintenance activities at those locations for outside the breeding season.

Overall, Alternative 1 could have significant impacts on riparian bird species, including white-tailed kite, little willow flycatcher, yellow-breasted chat, gila woodpecker, and crissal thrasher when compared to the existing environmental setting and the No Action Alternative.

Gull-Billed Tern and Black Skimmer. The gull-billed tern and black skimmer both occur at the Salton Sea for breeding and foraging, and both prefer to nest on islands for protection from predators as they are ground-nesting species. No island nesting sites are currently present within the Project area for Alternative 1; however, both species have occasionally nested along the Sea's shoreline, although with limited success. Although it is unlikely that construction would result in direct impacts on the gull-billed tern and black skimmer, nesting failure due to construction activities or noise adjacent to nesting areas could occur if construction activities, including drain interception ditch construction, took place during the species' breeding season (April through September). Since relatively few individuals are present in the region, loss of reproduction for even a portion of the local breeding population for 1 year could have substantial effects on the population size. Construction of the river diversion, sedimentation basins, and conveyance pipelines would not affect any breeding habitat.

Project construction would result in a temporary disturbance or alteration of shallow shoreline habitat (approximately 6.3 miles) where the ponds would be constructed compared to current conditions. Although gull-billed terns and black skimmers might forage along the shoreline, few would be expected in this area because nesting is limited due to lack of predator protection along the shoreline. Construction noise and activity, if adjacent to areas occupied by gull-billed tern or black skimmer, would have a low potential to result in nesting failure if such activities occur during the breeding season (April through September).

Maintenance activities within the ponds would have the potential to affect nesting birds through noise and human presence, if such activities occurred during the breeding season and near nesting sites.

Overall, Alternative 1 would have beneficial impacts (See Impact BIO-1c) due to increased nesting opportunities; however, it also could result in significant impacts of noise and human activity on the gull-billed tern and black skimmer when compared to the existing environmental setting and the No Action Alternative during construction, operation, and maintenance.

Loggerhead Shrike. Because loggerhead shrikes are or could be present in shrub and scrub habitat along the Salton Sea shoreline, Project construction activities for the drain interception ditches and the landward pond berm could result in temporary disturbance of suitable habitat. Suitable habitat could also be present along the water delivery pipeline corridor and be disturbed or lost during installation of the pipelines. If these construction activities would result in habitat disturbance or loss during the breeding season (April through September), breeding efforts of any pairs present may fail. Construction noise and activity, if adjacent to areas occupied by nesting loggerhead shrikes, could result in nesting failure. Compared to the No Action Alternative and current existing conditions, the Project could result in impacts on nesting loggerhead shrike if nesting habitat is present within or immediately adjacent to the construction area. Maintenance of the drain interception ditches could affect breeding loggerhead shrikes immediately adjacent to the channels if maintenance occurred during the breeding season.

Overall, Alternative 1 could have significant impacts on loggerhead shrikes when compared to the existing environmental setting and the No Action Alternative.

Mitigation Measures

MM BIO-1: Prepare and implement a desert pupfish protection and relocation plan. This plan is applies primarily to construction and maintenance of the drain interception ditches but will also apply to pond construction and maintenance activities as noted and will provide:

1. Protocols for preconstruction or premaintenance surveys to assess species presence and spawning within or immediately adjacent to work areas (e.g., in the drains/drain channels, along the shoreline if construction is in the "wet," and around the pond margins for maintenance);

2. Capture (e.g., trapping in the drains for construction and maintenance; or trapping, dip netting, and seining in the ponds if drained or if the water level is dropped) and transport methods to minimize handling and stress as well as exposure to heat, low DO, and crowding;

3. Identification of locations for release of captured desert pupfish;

4. Timing windows when construction or maintenance in shallow shoreline areas and in the drain mouths/channels may be conducted with minimal effects on desert pupfish spawning;

5. Protocols for maintenance activities in the drain interception ditches, such as a rotating schedule to ensure only a portion of the channel is maintained at one time, clearing only part of the vegetation at one time, and timing of maintenance to avoid peak spawning;

6. Maintenance protocol for the 1/8-inch mesh screen on the saline water intake until salinity reaches 68 ppt; and

7. Adaptive management procedures that include assessment of mitigation measure effectiveness, development of revised measures to improve effectiveness, and similar assessment of revised measures to verify effectiveness.

All desert pupfish mitigation measures will be in conformance with the Biological Opinion from USFWS for the Project.

MM BIO-2: Prepare and implement a preconstruction/maintenance survey plan for bird species. The plan will include preparation of suitable habitat maps that are updated periodically to focus survey locations as well as survey methods consistent with current science and regulations. Adaptive management measures will also be included in the plan. The following describes the surveys and their timing for various bird species.

Burrowing Owl. To avoid impacts on nesting or wintering burrowing owls within the Project impact area, conduct preconstruction (or pre-maintenance) surveys within suitable burrowing owl habitat that could be affected by Project activities. Surveys will be conducted using the latest protocol methods and with concurrence from DFG; currently, methods described by the Department of Fish and Game Staff Report on Burrowing Owl Mitigation (DFG 1995) will be used. If burrowing owls are detected nesting or wintering within the Project impact area, a buffer will be established around the active burrow so that direct impacts on the burrow will be avoided. For construction during the breeding season (February through August), a buffer of 250 feet around the active nesting burrow will be maintained until breeding is complete and the young have fledged (can fly). For nonbreeding birds, the buffer will be 160 feet. If burrowing owls are detected occupying a burrow within the Project impact area at any time of year, the owls will be removed using passive methods during the nonbreeding season. Passive removal involves excluding owls from their occupied burrows and creating alternate natural or artificial burrows for them that are at least 160 feet from the impact area and that are within or contiguous to a minimum of 6.5 acres of foraging habitat for each pair (DFG 1995). Passive relocation may be implemented during the breeding season if a qualified biologist can verify through noninvasive methods, such as scoping, that breeding has not begun or juveniles are foraging independently and able to fly. The unoccupied burrows would be collapsed in accordance with DFG-approved guidelines (DFG 1995).

California Black Rail and Yuma Clapper Rail. Conduct preconstruction (or premaintenance) focused surveys for California black rail and Yuma clapper rail where Project features are within or immediately adjacent to suitable habitat. Surveys will be conducted using current USFWS methods and/or methods approved by the DFG. If California black rails or Yuma clapper rails are detected within 500 feet of planned construction/maintenance activity locations, work within that distance of the birds will be rescheduled for after the birds complete nesting.

Nesting Birds. Conduct preconstruction (or premaintenance) surveys for all Project features within suitable habitat if construction or maintenance activities will take place during the breeding season. Breeding birds are protected under the Migratory Treaty Bird Act as described in Impact BIO-5a. Surveys will be conducted using methods approved by the DFG. If breeding birds are detected within the Project impact area, a protective buffer (100 to 500 feet, depending on species) will be provided until it is confirmed that breeding is complete.

Western Snowy Plover. Conduct preconstruction (or pre-maintenance) focused surveys for western snowy plovers within suitable habitat that could be affected. Surveys will be conducted using current USFWS methods and/or methods approved by the DFG. If western snowy plovers are detected within the Project impact area, construction or maintenance activities will be conducted under a qualified biologist's supervision so that direct impacts are avoided. If breeding snowy plovers are detected within the Project impact area, construction or maintenance will be postponed and a protective buffer provided until it is confirmed that breeding is complete.

MM BIO-3: Conduct noise calculations/measurements and implement noise attenuation measures, if needed. Based on equipment specifications, calculate or measure the distance from equipment where noise would be greater than or equal to 60 A-weighted decibels (dBA) equivalent sound level (Leq). This would also include multiple noise sources, if applicable. Then, use that distance to determine where noise could exceed 60 dBA Leq within known or potential nesting habitat adjacent to the Project footprint. If any such overlaps occur, schedule work to avoid the breeding season in those areas. If construction must occur during the breeding season at those sites, monitor nesting activity to determine if any effects are occurring. If effects are observed, implement noise attenuation measures such as noise walls and hay bales. Monitor the noise and bird behavior to verify that attenuation measures are successful. Develop and implement additional protection measures if monitoring shows that impacts are still occurring. If noise would be less than 60 dBA Leq, no additional measures are required. (Note: The threshold of 60 dBA Leq used here to protect bird nesting is a conservative estimate of the level above which adverse effects could occur. The actual threshold varies by species and type of noise.)

MM BIO-4: Design interception ditches to avoid alteration of water levels in adjacent marshes. Design of the interception ditches will balance local surface and subsurface water movement so that the amount of water in adjacent marshes is not affected.

Residual Impact

Implementation of MM BIO-1 would reduce impacts on desert pupfish to less than significant because many individuals in the drains would be moved to safe areas and disruption of spawning would be minimized.

Implementation of MM BIO-2 and MM BIO-3 would reduce impacts on burrowing owls, California black rails, Yuma clapper rails, other nesting marsh and riparian birds, western snowy plovers, nesting gull-billed terns and black skimmers, and nesting loggerhead shrikes to less than significant because impacts on nesting and wintering individuals would be avoided.

Implementation of MM BIO-4 would avoid impacts on adjacent marsh habitat for nesting birds.

Impact BIO-1b: Project construction and operation would have minor effects on habitat and individuals of several special-status bird and mammal species (less-than-significant or no impact).

Fish

Mosquito control activities, in accordance with the Mosquito Control Plan (Appendix F), would have minimal effects on desert pupfish. Bacterial larvicides that could be used are not toxic to fish and would have minimal effects on invertebrate prey. Use of adulticides would not occur over the SCH ponds, thus minimizing the potential for toxic effects on pupfish. Impacts would be less than significant when compared to both the existing environmental setting and the No Action Alternative.

Birds

During operations, noise from the pumps that brings saline water to the ponds is unlikely to affect breeding because the pump stations would be located at the edge of the outer berm and offshore (approximately 3,000 feet or more from the existing shoreline), or on the exposed seabed when the Sea recedes that far.

Burrowing Owl. Construction of the pump stations and pipeline for bringing saline water from the Salton Sea to mix with the water for salinity control in the ponds would be unlikely to affect burrowing owls unless they had nesting or wintering burrows within the small area where the pipeline would cross the river bank. As the Salton Sea recedes, the outer pump station may require relocation or reconstruction and a pipeline extension placed on or within the exposed Seabed. These activities would not affect burrowing owls because none are expected to be present in the recently exposed Seabed due to lack of suitable habitat. No impacts would occur compared to the existing environmental setting and the No Action Alternative.

California Black Rail and Yuma Clapper Rail. Operation and maintenance of the pump stations to bring saline water to the ponds would not affect breeding of the California black rail and Yuma clapper rail because no suitable habitat for these species is present at or near those locations. Maintenance of the ponds would not affect these species because salinity of the habitat pond water and design of the sedimentation basins (steep slopes, water depth greater than emergent vegetation can grow in) would prevent development of marsh habitat used by these species. Noise from maintenance activities within the ponds would not be high enough to affect either species in nearby habitats due to attenuation with distance. The sedimentation basins are designed to minimize growth of emergent vegetation with maintenance at least annually so that no habitat suitable for either rail species would develop. Impacts on both species would be less than significant compared to the existing environmental setting and the No Action Alternative.

Other Nesting Marsh Bird Species. Operation and maintenance of the pump stations to bring saline water to the ponds would not disrupt breeding of the redhead, least bittern, or yellow-headed blackbird because no suitable habitat for these species is present at or near those locations. As described for the rail species, the Project ponds and sedimentation basins would not provide suitable habitat for marsh bird nesting. Impacts would be less than significant compared to the existing environmental setting and the No Action Alternative.

Western Snowy Plover. Operation of the pump stations to bring saline water to the ponds would not disrupt breeding of the western snowy plover because no suitable nesting habitat for the species is present at the location of the pump stations. No impacts would occur compared to the existing environmental setting and the No Action Alternative.

Riparian Bird Species. Operation of the pump stations to bring saline water to the ponds would not disrupt breeding of the riparian bird species because no suitable nesting habitat for these species is present at the pump stations' locations. No impacts would occur compared to the existing environmental setting and the No Action Alternative.

Gull-Billed Tern and Black Skimmer. Compared to the No Action Alternative, Project construction would result in temporary disturbance or alteration of shallow shoreline habitat, but would maintain that shoreline as the Sea recedes, presumably providing a continuing food source within the ponds that would not otherwise exist under the No Action Alternative. Compared to current conditions, the Project would result in a temporary loss of foraging area and a very limited loss of potential nesting areas, and would equally replace foraging areas. Impacts would be less than significant compared to the existing environmental setting and the No Action Alternative.

Loggerhead Shrike. Operation and maintenance activities for the ponds and pump stations are not expected to affect loggerhead shrike breeding because these activities would not occur in or adjacent to nesting habitat. No impacts would occur compared to the existing environmental setting and the No Action Alternative.

Mountain Plover, Lesser Sandhill Crane, and Greater Sandhill Crane. The mountain plover and lesser and greater sandhill cranes occur near the Project area as wintering species. They occur within plowed, barren, and burned agricultural fields and could occur within the Project area depending on placement of the diversion and conveyance pipeline. The mountain plover and lesser and greater sandhill cranes are nomadic and forage where suitable food is available. Their occurrence within the region and within the Project area is unpredictable. Due to their nomadic nature and flexibility for foraging, the foraging large area that is available to them, and their ability to avoid disburbances, these species are unlikely to be affected by Project construction and operation (including maintenance). Therefore, impacts would be less than significant. Assuming suitable foraging habitat would be available, Project effects on these species would be similar under the No Action Alternative and existing conditions.

American Peregrine Falcon and Bald Eagle. The American peregrine falcon and bald eagle occur within the Project area as wintering species but may also occur as visitors at any time of year. They forage over open water as well as over agricultural fields and could occur within the Project area. These species are nomadic in their behavior and forage opportunistically wherever suitable food is available. Their occurrence within the region and within the Project area is unpredictable. Due to the nomadic nature of their occurrence and flexibility for foraging, and the large area that is available to them for foraging, it is unlikely that these species would be affected by Project construction, operation, or maintenance, and impacts would be less than significant. A similar amount of foraging habitat would be available for these species under the No Action Alternative and as compared to current existing conditions.

Wood Stork. The wood stork occurs within the Project region as a nonbreeding species, and forages along the shoreline and in the bays at the New and Alamo rivers and also within flooded fields; it could occur within the Project area. The species will forage wherever suitable food is available. Due to the nomadic nature of their occurrence and flexibility for foraging, and the large area that is available to them for foraging, it is unlikely that the species would be affected by Project construction, operation, or maintenance, and impacts would be less than significant. The amount of foraging habitat for the species would be similar under the No Action Alternative and current existing conditions.

Large-Billed Savannah Sparrow. The large-billed savannah sparrow occurs within the Project region as a wintering species. The species is loosely territorial or occurs in flocks during the period when present at the Salton Sea and will forage wherever suitable food is available, including in shrubs and on the beach along the shoreline but also around existing upland ponds and along weedy ditches. It has the potential to be present in the drain interception ditch areas and along the diversion pipeline route. Due to the nomadic nature of their occurrence and flexibility for foraging, and the large area that is available to them for foraging, it is unlikely that the species would be affected by Project construction, operation, or maintenance, and impacts would be less than significant. The amount of foraging habitat for the species would be similar under the No Action Alternative and current existing conditions.

Mammals

Western Yellow Bat. The western yellow bat has a moderate potential to occur within the Project area and could forage over the entire Project region. The potential for roosting in trees along the New River is low as the species prefers palm trees that are not present there. The species forages opportunistically wherever suitable food is available. Due to the unpredictable and opportunistic nature of their occurrence, flexibility for foraging habitat and location, the large area that is available to them for foraging, and the small amount of foraging habitat within the Project area, it is unlikely that the species would be affected by the Project construction, operation, or maintenance, a less-than-significant impact when compared to the existing environmental setting and the No Action Alternative.

American Badger. Because the American badger has a low potential to occur within the Project area but was recorded in the region in the past and could forage within much of the riparian habitat along the New River as well as in scrub habitats, construction activities for the diversion and conveyance pipelines could result in habitat disturbance and affect individuals if construction collapsed or destroyed a badger burrow. Due to the unpredictable and opportunistic nature of their occurrence, flexibility for foraging habitat and location, and the large area that is available to them for foraging, it is unlikely that the species would be affected by Project construction and operation, a less-than-significant impact. A similar amount of foraging habitat could be affected under the No Action Alternative and the existing conditions.

Impact BIO-1c: Project operation would provide habitat for desert pupfish and several special-status bird species (beneficial impact). The SCH ponds would provide additional habitat for desert pupfish after the Salton Sea exceeds their water quality tolerances. Isolated populations would remain where the drains and tributaries (rivers and several streams) enter the Sea, but the ponds would provide approximately 3,130 acres of habitat with suitable water quality. In addition, the population in the drains entering the interception ditches would be permanently connected.

The SCH ponds are specifically designed to attract gull-billed tern and black skimmer, among several other special-status bird species, and the habitat provided would include the shallow water they require for foraging, a food source, and constructed islands that would provide predator protection for nesting upon completion of construction, which would increase the amount of habitat for these species. The addition of islands protected from predators and a food source for piscivorous birds is a beneficial impact of the Project.

Increasing salinity in the Sea may result in changes to the invertebrate food base for the species during the Project. Whether western snowy plovers would be affected by these changes is not known at this time. If, under the No Action Alternative conditions, the increased salinity changes the prey base and the food source is unsuitable for the western snowy plover, the Project would have a beneficial impact on this species by providing foraging opportunities that may not exist under the No Action Alternative.

Impact BIO-2: Project construction and operation would cause a temporary disturbance or loss of riparian habitat and/or sensitive habitat (significant impact). Project construction activities could result in removal of riparian habitat, particularly stands of tamarisk adjacent to the New River, depending on the amount of excavation for material to construct the ponds and berms. For areas to be inundated by the ponds or where structures would be placed (e.g., access roadways along the river berms, river water intake), the loss would be permanent. Riparian habitat would be disturbed or temporarily removed for construction of the water delivery pipelines and berms separating the river from the ponds. A small amount of mesquite bosque is anticipated to be avoided but could also be affected by construction of the diversion structure and sedimentation basin, depending on their exact location. However, these Project structures would be placed to minimize or avoid impacts to the maximum extent feasible. In addition, habitat removed by the Project would be restored to its original condition, or more desirable habitat, following construction of the conveyance pipelines. For example, it would be acceptable to replace tamarisk scrub that was removed with screwbean mesquite bosque.

If removal of riparian habitat were substantial (greater than 2 acres) or if screwbean mesquite bosque were removed, this impact would be significant. As currently planned, mesquite bosque would not be removed, approximately 7 acres of tamarisk would be temporarily removed for construction of the diversion along the New River, and approximately 87 acres of tamarisk scrub and woodland could be removed for construction of the ponds. Removal of up to 87 acres of tamarisk for pond construction represents the worst case and actual numbers would probably be lower depending on exact limits of excavation for material to construct the berms.

Removal of riparian and/or sensitive habitat would be a significant impact when compared to the existing environmental setting and the No Action Alternative.

Mitigation Measures

MM BIO-5: Prepare and implement a Habitat Protection, Mitigation, and Restoration Program. Plan preparation will be complete prior to commencement of construction. The restoration program will address the following considerations:

1. Avoidance of sensitive and riparian habitats to the greatest extent feasible, including avoidance of disturbances in or near these habitats during the bird breeding season.
2. Quantifying maximum area of naturally occurring plant communities that could be temporarily and permanently removed for construction of Project facilities, by plant community.
3. Restoration at a minimum rate of 1:1 for nonnative plant communities (i.e., tamarisk woodland or scrub) and 3:1 for native plant communities temporarily removed during Project construction, or as required in Project permits. Habitats restored at 1:1 will be preferentially restored where they were removed, unless it is infeasible or a more desirable off-site location is identified. Species to be used in restoration may include either those that were removed or native species that occur or occurred naturally in the Project area and are suitable to the site. If native species are used to replace nonnative species, mitigation ratios can be reduced. For restoration of tamarisk temporarily removed, natural colonization of the disturbed area is likely to occur and no planting may be needed. The area would still be monitored to document restoration. Permanently removed riparian habitat within the pond area would be replaced by aquatic habitat of equal surface area with a similar or greater ecological value.
4. Identification of locations for on- and off-site restoration, including funding for land purchases and/or easements and agreements with property owners to complete the restoration.
5. Use of only local native seed (or propagule) sources for native species used in restoration.
6. Details on propagation, planting/seeding, irrigation, maintenance (including weed control for species that could interfere with restoration), site access, remedial measures, monitoring, reporting, and photo-documentation. These details will be specific to each site if more than one planting area or type is addressed in the plan.
7. Performance criteria to be met for each habitat type being restored.
8. Monitoring, with a funding source, until performance criteria are met, which may be for a minimum of 5 years.

Residual Impact

The residual impact would be less than significant following implementation of MM BIO-5, because habitat that would be removed would be restored in at least the amount that was removed.

Impact BIO-3a: Project construction would result in temporary disturbance of Federal Waters of the U.S. and minimal effects on wetlands (less-than-significant impact). When compared to existing conditions, construction of the ponds and diversion would result in a temporary disturbance to approximately 1,335 acres of Waters of the U.S. because the ponds would be built within the existing Salton Sea and the diversion would be on the bank of the New River. Although placement of permanent Project facilities in Waters of the U.S., including the berms and pump stations for the ponds, would result in a permanent loss of approximately 22 acres of Waters of the U.S., the Project would have a net increase of 1,775 acres (see Impact BIO-3b).

Compared to the No Action Alternative, construction activities would result in temporary disturbance to a smaller amount of Waters of the U.S. than under current conditions because the Sea would have receded some by the time construction begins and will continue to recede even more before construction is completed. The berms and pump stations for the ponds would be permanent facilities, but their impact would be temporary as the Sea recedes. Construction of the diversion would cause the same temporary disturbance of Waters of the U.S. as described for the existing conditions. Under the No Action Alternative, construction impacts on Waters of the U.S. would be less than significant because the disturbance would be temporary as would the small loss as a result of berms. Operation and maintenance of the ponds and associated facilities would cause temporary disturbances to Waters of the U.S. at intervals during the Project life. Overall, impacts would be less than significant when compared to the existing environmental setting and the No Action Alternative.

Construction activities could result in the minimal removal of wetlands, primarily during construction of the river diversion and drain interception ditches. The steep earthen sides of the sedimentation basin would grow a narrow band of emergent wetland vegetation that would likely be removed at least annually during basin maintenance. Removal of the small amounts of wetlands that develop in the sedimentation basin would be a less-than-significant impact when compared to the existing environmental setting and the No Action Alternative.

Operation of the interception ditches would have the potential to affect adjacent wetlands by reducing the amount of water in them as described in Impact BIO-1a. No substantial loss of wetlands is likely to occur, but less-than-significant alteration of some wetlands could occur. Implementation of MM BIO-4 would avoid this impact.

Impact BIO-3b: Project operation would increase the amount of Federal Waters of the U.S. (beneficial impact). Compared to existing conditions, Alternative 1 would result in a net increase in the extent of Waters of the U.S. by about 1,775 acres because the ponds would restore Waters of the U.S. between elevation -228 feet and -231 feet previously lost by the receding Sea. With the Sea's anticipated receding shoreline under the No Action Alternative, the amount of Waters of the U.S. restored would be increasingly more (up to the entire pond area minus berms and islands). The Project is anticipated to also improve the quality of Waters of the U.S. within the area occupied by the SCH ponds compared to the existing environmental setting and the No Action Alternative, and overall impacts would be beneficial.

Impact BIO-4: Project construction and operation would not interfere with movement of fish and wildlife species, but construction could remove snags for colonial nesting birds (less-than-significant impact). Effects of Alternative 1 on desert pupfish movement have been addressed in Impact BIO-1a. Movement of other aquatic species would not be affected by Project construction and operation. No migratory fish are present, and construction of the ponds and diversion structure would not interfere with movement of the nonnative aquatic species in the Salton Sea and New River. Impacts on aquatic species movement would be less than significant when compared to the existing environmental setting and the No Action Alternative.

Construction activities could result in the direct removal of snags that are used by colonial nesting birds that include double-crested cormorant, great blue heron, cattle egret, great egret, and snowy egret. However, most snags could be avoided and left in place for use by birds until they deteriorate and collapse due to natural processes. A few trees located adjacent to the New River that may be used by colonial nesters also could be removed, depending on placement of the diversion structure and conveyance pipeline crossing of the New River to reach the eastern ponds as well as improvement of the river berms. However, the Project structures would be placed to minimize or avoid impacts to the maximum extent feasible. Removal of snags and nest trees during construction would be a less-than-significant impact compared to existing conditions. Compared to the No Action Alternative conditions, the snags would be lost as the Sea recedes, but nesting tree loss would have the same short-term impact as under existing conditions. Implementation of MM BIO-5 would further reduce impacts on colonial nesting birds.

Impact BIO-5a: Project construction and operation could affect nesting by some common bird species and introduction of invasive species (significant impact). The Salton Sea and surrounding region provide nesting, wintering, and migration stopover habitat for hundreds of bird species and thousands of individuals. The Project area provides habitat for a subset of the species and individuals that occur within the greater Salton Sea area. A number of common bird species could be affected by the Project. (Effects on special-status birds such as burrowing owl, black skimmer, and gull-billed tern have been addressed under Impact BIO-1a.)

Because common species are or could be present nesting and/or foraging for breeding, within or immediately adjacent to the Project footprint, construction activities for the ponds, drain interception ditches around the Project area, and diversion facilities, if they were to occur during the bird breeding season (March through September), could result in destruction of nests and nest abandonment by adults due to direct disturbance or noise and human activity. Nesting birds are protected under the Migratory Bird Treaty Act and Fish and Game Code Section 3503, and impacts on nesting are considered a significant impact compared to the existing environmental setting and the No Action Alternative.

Maintenance activities have the potential to disturb bird nesting on the islands and along the berms if such activities occurred during the breeding season. Such disturbances could cause nest abandonment or nest destruction if physical activities occurred on the islands or along the berms. During operations, both pump stations would provide an isolated structure that could be used by some species of birds for resting, roosting, or even nesting. These structures may include deterrents to bird use (see Section 2.4.1.2). If such deterrents are not used or are not effective, maintenance of the pump stations would intermittently disturb any birds using the structures. Disturbance during the nesting season could result in nest failure for the pairs using the structures.

Invasive plants and animals could be brought into the Project site on construction and operations/maintenance equipment, including hand tools, as well as vehicles and boots of workers. Invasive terrestrial plants not already present are less likely to be introduced than invasive aquatic plant species. Invasive aquatic animal species are also a concern, particularly in fresh to brackish areas, where they can alter ecological functions by competing for space and food as well as harboring parasites that can affect fish productivity. Several invasive species of snails are known to be present in the Salton Basin and could be transported to the SCH site via equipment operated by local contractors as well as local workers. Invasive species from outside the region could also be brought in on equipment from other areas.

Alternative 1 could have significant impacts on common nesting birds. If invasive species become established as a result of the Project, impacts could be significant.

Mitigation Measures

For disturbance impacts on nesting birds, MM BIO-2 and MM BIO-3 would apply.

MM BIO-6: Clean equipment prior to site delivery. Specifications for ensuring that all equipment, personal gear, and materials brought to the site are clean and free of invasive plants (including seeds) and animals will be included in all construction and maintenance contracts. Equipment, gear, and other materials will be inspected to verify that it is clean.

Residual Impact

With implementation of MM BIO-2 and MM BIO-3, residual impacts would be less than significant because disturbance of nesting birds would be avoided. Implementation of MM BIO-6 would reduce residual impacts of invasive species to less than significant by minimizing the potential for introduction of such species.

Impact BIO-5b: Project construction and operation would have minor effects on common fish (native and nonnative), wildlife species, and native plant communities (less-than-significant or no impact). No common upland native plant communities are present in the Alternative 1 area, and no impacts would occur from Project construction or operation.

Some aquatic organisms would be entrained with the water diverted from the New River and end up in the sedimentation basin and ultimately in the SCH ponds. Since they are freshwater species, many would survive in the sedimentation basin, but none are expected to survive in the ponds, which would typically be managed at salinities above 20 ppt. River flow downstream of the diversion would be reduced (see Section 3.11) which would also reduce the amount (volume) of aquatic habitat. Loss of some individuals of or habitat for nonnative species would not adversely affect their populations in the New River, and impacts would be less than significant.

Although the Project generally would benefit aquatic species, some water quality instabilities are likely to occur, at least in some of the ponds, which could affect aquatic organisms. The nutrient load in the New River would sustain high primary productivity (primarily phytoplankton) to support invertebrates and fish. As a result, DO in the ponds could become very low at times, such as near dawn, due to respiration of all organisms present. Water temperatures are also expected to fluctuate in these shallow ponds on a daily and seasonal basis with thermal stratification occurring at times. The lower thermal and DO tolerances for fish may be exceeded under certain environmental conditions, but not necessarily at the same time, resulting in fish kills that reduce the population size in the ponds where this phenomenon occurs. The lower DO tolerance for some benthic invertebrate species that provide food for fish may also be exceeded at times in some locations, primarily in the deeper portions of some ponds. The duration of such events is expected to be short with rapid recovery of the fish and invertebrate populations. Impacts on aquatic species would be less than significant, but loss of adequate fish for forage could affect piscivorous birds that rely on the ponds for forage. The level of effect would depend on how extensive the fish die-off was (i.e., what proportion of fish present were killed in a pond and how many ponds were affected). The Project is designed to test various pond designs with monitoring to determine what works best to meet the Project goals and objectives.

The Project would result in a temporary disturbance or loss of shallow shoreline habitat (approximately 6.3 miles) where the ponds would be constructed compared to current conditions. Individuals of shoreline and shallow water foraging species would still be able to move around (outside) the ponds and forage along the Sea’s other shoreline areas. Although the SCH ponds are not specifically designed for species that forage on invertebrates, the shallow water within them would provide the same amount or more suitable foraging habitat. The part of the existing shoreline not altered by the shoreline low berm, associated road, and slope protection would again be available for nesting and foraging upon completion of construction, and shorelines along the pond berms could provide additional habitat, although it may be rocky rather than sedimentary due to slope protection. For common piscivorous birds such as the American white pelican, Caspian tern, and double-crested cormorant, construction would temporarily preclude foraging within the work area, a less-than-significant impact. Limited nesting habitat is currently present in the Alternative 1 area due to lack of predator protection along the shoreline, and impacts on nesting habitat would be less than significant.

Project construction could result in temporary disturbances to terrestrial wildlife habitats through ground disturbance and noise. Construction of the landside berm, improvement of the river berms, and excavation of the drain interception ditches would occur in terrestrial habitats, but a small amount of habitat would be affected. Individuals of most species would move out of the disturbance area so that few individuals would be directly affected. Maintenance activities would cause temporary disturbances at specific locations for short periods of time, such as driving on access roads (including on the berms) or operation of maintenance equipment. These impacts would be less than significant compared to current conditions and the No Action Alternative.

Operation of the pump stations to bring saline water to the ponds would not disrupt breeding of common birds that nest within the Project area because the pump stations would be located adjacent to the seaward side of the outer berm and in the Sea away from any nesting habitat, including the islands within the ponds. Maintenance activities have the potential to disturb bird foraging throughout the Project. Effects on foraging, however, would be less than significant because maintenance would occur in only a portion of the ponds at a time leaving other foraging areas available nearby within the Project area.

The sedimentation basin adjacent to the river diversion would likely attract birds, such as ducks and gulls, that rest on the water surface. Due to the basin's steep sides and annual maintenance, foraging and nesting habitat for these species would not develop. The basin, therefore, would not increase the population size of these birds. Ducks and geese are present at the Salton Sea primarily during the winter when the duck clubs operate, and the amount of surface water provided by the basin (approximately 60 acres) would be small compared to that of the duck clubs. Piscivorous birds may use the basin to forage if populations of fish develop from individuals entrained with the diverted water. Impacts of operation and maintenance of the sedimentation basins on birds would be less than significant compared to the existing environmental setting and the No Action Alternative.

Effects of Contaminants

Contaminants in the water and sediment, such as selenium and pesticides, could impact biota utilizing the SCH ponds. Breeding species that could be exposed to selenium by feeding at the SCH ponds include gull-billed tern, California brown pelican, double-crested cormorant, Caspian tern, black skimmer, black-necked stilt, American avocet, and western snowy plover. Ecorisk modeling was used to estimate potential selenium concentrations in water and biota for different Project alternatives and operations (model scenarios of river water blended with Salton Sea water to achieve 20 ppt or 35 ppt salinity in ponds) (Sickman et al. 2011, see Appendix I). For Alternative 1, estimated egg selenium concentrations would be 6.0-8.3 µg/g dw in ponds operated at salinities of 20 to 35 ppt, and less than 6 µg/g dw for ponds operated at 40 ppt or greater. This egg selenium concentration exceeds the conservative toxicity threshold (>6.0 µg/g dw), which would increase the probability of reduced hatching success in some species, but would not reach levels associated with teratogenesis (>12 µg/g dw) (Ohlendorf and Heinz 2011).

The actual magnitude of selenium impacts for the SCH Project would be lower than estimated by Sickman et al. (2011). First, the ecorisk model assumed all diet comes from the SCH ponds. The actual concentrations would likely be lower than modeled because the birds' foraging range would include other habitats beyond the SCH ponds. For example, the actual concentration could be less for gull-billed terns because they forage extensively in agricultural fields as well as consuming fish. Second, when the model was run using parameters estimated from the SHP complex, the modeled egg selenium concentrations were greater than the actual measured egg concentrations (Miles et al. 2009), indicating that this ecorisk model is a very conservative estimator of risk. Third, selenium concentrations decreased over time at other constructed habitats in the region, both in sediment of freshwater treatment wetlands (Johnson et al. 2009) and eggs from saline ponds (Miles et al. 2009), which suggests that selenium removal pathways could develop within the first 1 to 2 years after construction (Sickman et al. 2011). Impacts of Alternative

1 on common bird reproductive success would be less than significant for bird species that forage on invertebrates due to the availability of other freshwater marsh foraging habitat in the area. For species of piscivorous birds that nest at the Sea, such as the Caspian tern, a reduction in breeding success would be unlikely, at least until fish are no longer present in the Sea, because foraging would not be limited to the SCH ponds and pond management to minimize the selenium risk would occur. To minimize selenium bioaccumulation through detritus, the SCH ponds and sedimentation basins would be designed and operated to discourage the growth of emergent vegetation, such as cattails and bulrushes, which contribute high amounts of organic matter. Impacts on common birds would be less than significant when compared to the existing environmental setting and the No Action Alternative.

Concerning pesticides, the predominant pesticide residue measured in Salton Sea sediments was DDE. Existing and estimated concentrations of DDE in sediments for each of the alternatives is presented in Table 3.4-5. The area-weighted DDE concentration (SCH Project column) of inundated pond sediment (undisturbed playa surface, borrow ditches, habitat swales, and submerged edges of berms and islands) was compared to existing conditions (i.e., DDE concentration of undisturbed surface sediment) to determine whether exposure to DDE would change due to pond construction and inundation.

For Alternative 1, the estimated DDE concentration of pond sediments would be very similar to existing conditions, with an increase of 0.7 ng/g for estimates based on mean existing DDE concentrations and an increase of 4.3 to 6.7 ng/g for estimates using only the highest observed DDE concentration (Table 3.4-5). Alternative 1 did not exceed the PEC concentration of 31.3 ng/g for any estimation. Impacts of DDE exposure from the Project would be less than significant when compared to the existing environmental setting and the No Action Alternative.

Effects of Diseases

Bird and fish die-offs have occurred since the Sea's creation in 1905, but their frequency and intensity have increased in the past 2 decades (Friend 2002; Moreau et al. 2007). Avian botulism, avian cholera, and Newcastle disease were determined to be the major causes of most monitored bird die-offs in the 1990s (DWR and DFG 2007; Moreau et al. 2007). Botulism spores occur in the sediment and are ingested by fish such as tilapia. Fish die-offs occur periodically at the Salton Sea, and fish-eating birds, especially pelicans, can die from botulism toxins ingested from dying fish. In general, outbreaks of avian cholera, a bacterial disease, occur among dense concentrations of waterfowl, usually during the winter. Most recently, outbreaks of botulism have occurred in 2006 and 2008. In the past 2 years, one episode of avian cholera began in December 2010 and ended before February 2011 (personal communication, K. Riesz 2011).

The proposed SCH ponds would have a low potential to expose birds to disease. If extensive fish die-offs occur in the ponds due to conditions such as anoxia or temperature extremes, the dead fish could poison fish-eating birds. The conditions that result in fish die-offs in the Salton Sea are usually due to large turnover events where deep anoxic waters come to the surface. In contrast, the SCH ponds would be much shallower and experience more mixing, which is expected to result in lower biological oxygen demand and less severe conditions of anoxia. Also, pond operations could be adjusted to reduce conditions that would be stressful to fish (e.g., periodically increase flow-through rates or reduce salinities). Therefore, the relative risk of fish die-offs in the SCH ponds would be lower compared to the Salton Sea under current conditions. The risk of avian cholera in the SCH ponds would likely be similar to or lower than the risk in existing wildlife ponds at Sonny Bono NWR or IWAs Wister Unit, where densities of waterfowl are higher than expected at the SCH ponds. To reduce the risk of disease transmission and spread, the SCH ponds are designed to allow boat access for monitoring and removal of bird carcasses, if necessary. Impacts of avian diseases from the Project would be less than significant when compared to the existing environmental setting and the No Action Alternative.

Impact BIO-5c: Project construction and operation would benefit common fish (native and nonnative) and wildlife species (beneficial impact). The SCH Project would benefit fish and aquatic invertebrates by restoring habitat that is more stable than the Sea's and with salinity near that of seawater. The SCH ponds would be specifically designed for piscivorous birds such as the American white pelican, Caspian tern, and double-crested cormorant, and habitat within the Project ponds would include the shallow water they require for foraging, a food source, and constructed islands that provide predator protection for resting and nesting. The amount of fish available for these birds would increase as the fish populations in the ponds develop and stabilize, and fish density should be higher than prior to Project construction. Providing forage fish as conditions in the Sea exceed the tolerance of fish currently present and the addition of islands protected from predators are beneficial impacts of the Project.

Compared to the No Action Alternative, the Project would result in a temporary loss of shallow shoreline habitat (approximately same amount as current conditions), but may result in changes to the invertebrate food base for species that rely on invertebrate food. If that occurs, the Project would be a beneficial impact for the species compared to the No Action Alternative by providing foraging opportunities that may not exist under future conditions. The Project would replace that temporary loss with equal or greater shoreline and provide a food source that may not exist under the No Action Alternative. For piscivorous birds, the Project would provide a food source as the source in the Salton Sea declines to a very low level with essentially no tilapia except in small areas at the drain and river outflows. The amount of fish provided, however, would be considerably less than that currently in the Sea and would support a smaller number of piscivorous birds. Consequently, after the Sea's salinity exceeds the tolerance of the fish species used by the birds, the Project would be the primary source of forage fish at the Sea, and the piscivorous bird populations would likely decline to match the more limited availability of food sources.

Overall, Alternative 1 could have beneficial impacts for piscivorous bird foraging and bird nesting on islands when compared to the existing environmental setting and the No Action Alternative. Although the Project would benefit common piscivorous bird foraging and nesting, a substantial decline in the numbers present at the Salton Sea would occur in the long term under No Action because the Project would support fewer birds.

3.4.4.5 Alternative 2 – New River, Pumped Diversion

Impact BIO-1a: Project construction and operation would affect habitat and individuals of desert pupfish and several special-status bird species (significant impact).

Desert Pupfish. Impacts on desert pupfish would be the same as described for Alternative 1, but the amount of shallow shoreline isolated would increase to 8.1 miles, and water from more existing agricultural drains would be collected into a third new drain interception ditch to the Salton Sea. MM BIO-1 would apply to Alternative 2 and would reduce impacts to less than significant.

Burrowing Owl. Construction impacts on the burrowing owl would be the same as described for Alternative 1; however, more existing agricultural drains within which burrowing owls could nest or winter would be collected into a third new drain interception ditch to the Sea, which could result in greater impacts. In contrast, the potential for impacts on burrowing owl habitat and nesting and wintering burrows would be reduced because no diversion structure and conveyance pipelines would be constructed. The sedimentation basins would be located at least partially within existing mudflat areas, thereby reducing the amount of existing potential burrowing owl habitat that would be affected. MM BIO-2 would apply to Alternative 2 and would reduce impacts to less than significant. Construction noise and activity would be the same as described for Alternative 1. MM BIO-3 would apply to Alternative 2 and would reduce impacts to less than significant.

Operation and maintenance impacts on burrowing owls would be the same as described for Alternative 1; however, a low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq that could disrupt breeding of burrowing owls if burrows are present within the 60-dBA contour. MM BIO-2 and MM BIO-3 would apply to Alternative 2 and would reduce impacts to less than significant.

California Black Rail and Yuma Clapper Rail. Impacts on the California black rail and Yuma clapper rail would be the same as described for Alternative 1; however, more existing agricultural drains would be collected into a third new drain interception ditch to the Salton Sea, which could result in greater impacts if suitable nesting habitat for either of these species is present where construction disturbances would occur. The potential for impacts on occupied freshwater marsh habitat would be reduced because no diversion structure, conveyance pipelines, and sedimentation basins would be constructed upstream along the New River. Operation and maintenance impacts for the drain interception ditch would be the same as described for Alternative 1. MM BIO-2 and MM BIO-4 would apply to Alternative 2 and would reduce impacts to less than significant. Construction noise and activity would be the same as described for Alternative 1. MM BIO-3 would apply and would reduce impacts to less than significant.

Other Nesting Marsh Bird Species. Impacts on redhead, least bittern, and yellow-headed blackbird would be the same as described for Alternative 1; however, more existing agricultural drains would be collected into a third new drain interception ditch to the Sea, which could result in greater impacts if freshwater marsh habitat is present and redhead, least bittern, and/or yellow-headed blackbird are nesting there at the time of construction. Operation and maintenance impacts on redhead, least bittern, and yellow-headed blackbird would be the same as described for Alternative 1. MM BIO-2 and MM BIO-4 would apply to Alternative 2 and would reduce impacts to less than significant. Construction noise and activity would be the same as described for Alternative 1. MM BIO-3 would apply to Alternative 2 and would reduce impacts to less than significant.

Western Snowy Plover. Impacts on western snowy plover would be the same as described for Alternative 1, but the amount of shoreline and shallow shoreline disturbed or lost would increase to 8.1 miles. MM BIO-2 would apply to Alternative 2 and would reduce impacts to less than significant. Construction noise impacts on western snowy plovers would be the same as described for Alternative 1. MM BIO-3 would apply to Alternative 2 and would reduce impacts to less than significant.

Operation of the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of the species if the pump is located adjacent to western snowy plover breeding habitat. MM BIO-2 and MM BIO-3 would apply to Alternative 2 and would reduce impacts to less than significant.

Riparian Bird Species. Impacts on white-tailed kite, little willow flycatcher, yellow-breasted chat, gila woodpecker, and crissal thrasher would be the same as described for Alternative 1; however, slightly more riparian habitat could be removed even though the upstream diversion structure, sedimentation basin, and conveyance pipelines would not be included in Alternative 2 (see Impact BIO-2). MM BIO-2 would apply to Alternative 2 and would reduce impacts to less than significant. Construction noise and activity would be the same as described for Alternative 1 but would not extend upstream along the New River. MM BIO-3 would apply to Alternative 2 and would reduce impacts to less than significant.

Operation and maintenance impacts on riparian birds would be the same as described for Alternative 1; however, a low lift pump diversion at the SCH ponds would be located adjacent to the New River, which may have noise levels greater than 60 dBA Leq. Any breeding of these species within the 60-dBA contour could be disrupted. MM BIO-2 and MM BIO-3 would apply to Alternative 2 and would reduce impacts to less than significant.

Gull-Billed Tern and Black Skimmer. Impacts on gull-billed terns and black skimmers would be the same as described for Alternative 1, but the amount of shoreline and shallow shoreline water disturbed during construction would increase to 8.1 miles, which could result in increased impacts on nesting and foraging locations. MM BIO-2 would apply to Alternative 2 and would reduce impacts to less than significant. Construction noise and activity impacts would be the same as described for Alternative 1. MM BIO-3 would apply to Alternative 2 and would reduce impacts to less than significant.

Operation and maintenance impacts on gull-billed tern and black skimmer would be the same as described for Alternative 1; however, the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of these species if the pump is located adjacent to breeding locations. MM BIO-2 and MM BIO-3 would apply to Alternative 2 and would reduce impacts to less than significant.

Loggerhead Shrike. Impacts on loggerhead shrikes would be the same as described for Alternative 1; however, impacts on potential breeding habitat would be reduced because the upstream diversion, conveyance pipelines, and sedimentation basins would not be built. Sedimentation basins would still be built but adjacent to the ponds in areas less likely to have potential breeding habitat for this species. This reduction would be at least partially offset by the increased amount of shoreline temporarily affected by construction activities. MM BIO-2 would apply to Alternative 2 and would reduce impacts to less than significant. Construction noise and activity would be the same as described for Alternative 1. MM BIO-3 would apply to Alternative 2 and would reduce impacts to less than significant.

Operation and maintenance impacts on loggerhead shrike would be the same as described for Alternative 1; however, the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of the species if the pump is located adjacent to breeding habitat. MM BIO-2 and MM BIO-3 would apply to Alternative 2 and would reduce impacts to less than significant.

Impact BIO-1b: Project construction and operation would have minor effects on habitat and individuals of several special-status species (less-than-significant or no impact).

Desert Pupfish. Effects of mosquito control activities would be less than significant as described for Alternative 1.

California Black Rail and Yuma Clapper Rail. The sedimentation basins would be located adjacent to the ponds and would be at least 1,000 feet away from existing marsh habitat. Impacts of construction noise would be less than significant at that distance from potential habitat for these species. Impacts of pond and sedimentation basin operation and maintenance on the California black rail or Yuma clapper rail would be the same as described for Alternative 1. The low lift pump diversion at the SCH ponds would be located near the Sea’s shoreline more than 1,000 feet from any freshwater marsh habitat. Thus, noise from this pump is not expected to exceed 60 dBA Leq at that habitat, and impacts of noise would be less than significant.

Other Nesting Marsh Bird Species. As described for the California black rail and Yuma clapper rail, impacts of an upstream diversion, conveyance pipelines, and sedimentation basin would not occur. Sedimentation basins would still be built but adjacent to the ponds and would be at least 1,000 feet away from existing marsh habitat. The low lift pump diversion at the SCH ponds would be located near the Sea’s shoreline more than 1,000 feet from any freshwater marsh habitat. Thus, noise from this pump is not expected to exceed 60 dBA Leq at that habitat, and impacts of noise would be less than significant.

Mountain Plover, Lesser Sandhill Crane, Greater Sandhill Crane, American Peregrine Falcon, Bald Eagle, Wood Stork, Large-Billed Savannah Sparrow, Western Yellow Bat, and American Badger. Impacts on these species would be the same as described for Alternative 1; impacts would be less than significant.

Impact BIO-1c: Project operation would provide habitat for desert pupfish and several special-status bird species (beneficial impact). The SCH ponds would provide the same beneficial habitat effects for desert pupfish and special-status bird species as described for Alternative 1, but the area of the ponds would be less (about 460 acres) at approximately 2,670 acres.

Impact BIO-2: Project construction and operation would cause a temporary disturbance or loss of riparian habitat and/or sensitive habitat (significant impact). Potential losses of riparian habitat under Alternative 2 may be slightly more than under Alternative 1 because a larger area of riparian habitat could be disturbed for pond construction along the Salton Sea's shore. Impacts on riparian vegetation are anticipated to be up to approximately 102 acres and would be significant.

No impact would occur to mesquite bosque because it occurs outside the Project disturbance area.

Mitigation Measures

Mitigation Measure MM BIO-5 would apply to Alternative 2.

Residual Impact

Implementation of MM BIO-5 would reduce impacts to less than significant.

Impact BIO-3a: Project construction would result in temporary disturbance of Federal Waters of the U.S. and minimal effects on wetlands (less-than-significant impact). Temporary disturbance of Waters of the U.S. during construction of Alternative 2 would be less than under Alternative 1 (approximately 662 acres) because the aerial extent of the Sea that would be displaced by the ponds is less. As discussed under Alternative 1, minor losses associated with construction of berms and other facilities would result in a small loss of Waters of the U.S. (approximately 13 acres), but the Project would provide a net increase of 1,995 acres (see Impact BIO-3b). Similar to Alternative 1, operation and maintenance of the ponds and associated facilities would cause temporary disturbances to Waters of the U.S. at intervals during the Project life.

Effects on wetlands would be approximately the same as for Alternative 1. Impacts on wetlands and other Waters of the U.S. would be less than significant.

Implementation of MM BIO-4 would avoid less-than-significant impacts of the interception ditches on adjacent wetlands.

Impact BIO-3b: Project operation would increase the amount of Federal Waters of the U.S. (beneficial impact). Compared to existing conditions, Alternative 2 would result in a net increase in the extent of Waters of the U.S. of about 1,995 acres, more than Alternative 1. With the Sea's anticipated receding shoreline under the No Action Alternative, the amount would increase up to the entire pond area (minus berms and islands). As for Alternative 1, the Project is anticipated to also improve the quality of Waters of the U.S. within the area occupied by the SCH ponds compared to existing conditions and the No Action Alternative, and overall impacts would be beneficial.

Impact BIO-4: Project construction and operation would not interfere with movement of fish and wildlife species, but construction could remove snags for colonial nesting birds (less-than-significant impact). The impact analysis for aquatic species in Impact BIO-4 of Alternative 1 would apply to Alternative 2, and impacts would be less than significant.

Impacts on colonial nesting birds would be the same as described for Alternative 1, but a little more riparian vegetation could be affected, even with no construction of an upstream diversion structure and conveyance pipelines (see Impact BIO-2).

Implementation of MM BIO-5 would further reduce these less-than-significant impacts.

Impact BIO-5a: Project construction and operation could affect nesting by some common bird species and introduction of invasive species (significant impact). Impacts on common native wildlife species would be the same as described for Alternative 1; however, more existing agricultural drains within which common bird species could nest would be collected into the new interception ditch, draining to the Salton Sea, which could result in greater impacts. In contrast, impacts on potential common bird nesting habitats would be reduced because no upstream diversion, conveyance pipelines, and sedimentation basin would be built. Construction of the sedimentation basins adjacent to the ponds would affect less common bird potential nesting habitat than at the upstream site.

Operation and maintenance impacts on common native wildlife species would be as described for Alternative 1; however, a low lift pump diversion at the SCH ponds, which may have noise levels greater than 60 dBA Leq, could disrupt breeding of common bird species within the 60 dBA noise contour.

The potential for introduction of invasive species would be the same as described for Alternative 1.

Mitigation Measures

MM BIO-2, MM BIO-3, and MM BIO-6 would apply to Alternative 2.

Residual Impact

Implementation of MM BIO-2, MM BIO-3, and MM BIO-6 would reduce impacts to less than significant.

Impact BIO-5b: Project construction and operation would have minor effects on common fish (native and nonnative), wildlife species, and native plant communities (less-than-significant or no impact). No upland common native plant communities are present as described for Alternative 1, and no impacts would occur.

Effects of diversion entrainment, reduced river flows downstream of the diversion, and water quality fluctuations in the SCH ponds on aquatic biota and temporary construction disturbances of shallow shoreline and terrestrial habitat on birds and terrestrial wildlife would be the same as described under Alternative 1, and impacts would be less than significant when compared to the existing environmental setting and the No Action Alternative. Operation of the pump stations and sedimentation basins would have effects similar to those described for Alternative 1, but the two sedimentation basins would total 40 acres (20 less than for Alternative 1).

Effects of selenium uptake, pesticides (Table 3.4-5), and avian diseases on common bird species would be essentially the same as described for Alternative 1. Impacts would be less than significant.

Impact BIO-5c: Project construction and operation would benefit common fish (native and nonnative) and wildlife species (beneficial impact). The beneficial effects of the ponds for aquatic species would be the same as for Alternative 1 except that less pond habitat (approximately 460 acres) would be present.

3.4.4.6 Alternative 3 – New River, Pumped Diversion + Cascading Ponds

Alternative 3 would be similar to Alternative 2 with the addition of cascading ponds on the seaward side of those ponds, resulting in a larger (400 acres) total pond area of 2,900 acres.

Impact BIO-1a: Project construction and operation would affect habitat and individuals of desert pupfish and several special-status bird species (significant impact).

Desert Pupfish. Impacts on desert pupfish would be the same as described for Alternative 1, but the amount of shallow shoreline isolated would increase to 8.1 miles, and water from more existing agricultural drains would be collected into a third new drain interception ditch to the Salton Sea as in Alternative 2. MM BIO-1 would apply to Alternative 3 and would reduce impacts to less than significant.

Burrowing Owl. Construction impacts on the burrowing owl would be the same as described for Alternative 1; however, more existing agricultural drains within which burrowing owls could nest or winter would be collected into the new interception ditch draining to the Sea, which could result in greater impacts as described in Alternative 2. In contrast, the potential for impacts on burrowing owl habitat and nesting and wintering burrows would be reduced because no diversion structure and conveyance pipelines would be constructed. The sedimentation basins would be located at least partially within existing mudflat areas, thereby reducing the amount of existing potential burrowing owl habitat that would be affected. MM BIO-2 would apply to Alternative 3 and would reduce impacts to less than significant. Construction noise and activity would be the same as described for Alternative 1. MM BIO-3 would apply to Alternative 3 and would reduce impacts to less than significant.

Operation and maintenance impacts on burrowing owls would be the same as described for Alternative 1; however, a low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq that could disrupt breeding of burrowing owls if burrows are present within the 60-dBA contour. MM BIO-2 and MM BIO-3 would apply to Alternative 3 and would reduce impacts to less than significant.

California Black Rail and Yuma Clapper Rail. Construction, operation, and maintenance impacts on the California black rail and Yuma clapper rail would be the same as described for Alternative 1; however, more existing agricultural drains would be collected into a third new drain interception ditch to the Salton Sea as described in Alternative 2. The potential for impacts on occupied freshwater marsh habitat would be reduced because no diversion structure, conveyance pipelines, and sedimentation basins would be constructed upstream along the New River. The sedimentation basins would be located adjacent to the ponds and would be at least 1,000 feet away from existing marsh habitat. MM BIO-2 and MM BIO-4 would apply to Alternative 3 and would reduce impacts to less than significant. Construction noise and activity would be the same as described for Alternative 1. MM BIO-3 would apply and would reduce impacts to less than significant.

Other Nesting Marsh Bird Species. Impacts on redhead, least bittern, and yellow-headed blackbird would be the same as described for Alternative 1; however, more existing agricultural drains would be collected into a third new drain interception ditch to the Sea as described in Alternative 2. Operation and maintenance impacts on redhead, least bittern, and yellow-headed blackbird would be the same as described for Alternative 1. MM BIO-2 and MM BIO-4 would apply to Alternative 3 and would reduce impacts to less than significant. Construction noise and activity would be the same as described for Alternative 1. MM BIO-3 would apply to Alternative 3 and would reduce impacts to less than significant.

Western Snowy Plover. Impacts on western snowy plover would be the same as described for Alternative 1, but the amount of shoreline and shallow shoreline disturbed or lost would increase to 8.1 miles. MM BIO-2 would apply to Alternative 3 and would reduce impacts to less than significant.

Construction noise impacts on western snowy plovers would be the same as described for Alternative 1. MM BIO-3 would apply to Alternative 3 and would reduce impacts to less than significant.

Operation of the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of the species if the pump is located adjacent to western snowy plover breeding habitat. MM BIO-2 and MM BIO-3 would apply to Alternative 3 and would reduce impacts to less than significant.

Riparian Bird Species. Impacts on white-tailed kite, little willow flycatcher, yellow-breasted chat, gila woodpecker, and crissal thrasher would be the same as described for Alternative 1; however, slightly more riparian habitat could be removed as described for Alternative 2 (see Impact BIO-2). MM BIO-2 would apply to Alternative 3 and would reduce impacts to less than significant. Construction noise and activity would be the same as described for Alternative 1 but would not extend upstream along the New River. MM BIO-3 would apply to Alternative 3 and would reduce impacts to less than significant.

Operation and maintenance impacts on riparian birds would be the same as described for Alternative 1; however, a low lift pump diversion at the SCH ponds would be located adjacent to the New River, which may have noise levels greater than 60 dBA Leq. Any breeding of these species within the 60-dBA contour could be disrupted. MM BIO-2 and MM BIO-3 would apply to Alternative 3 and would reduce impacts to less than significant.

Gull-Billed Tern and Black Skimmer. Impacts on gull-billed terns and black skimmers would be the same as described for Alternative 1, but the amount of shoreline and shallow shoreline water disturbed during construction would increase to 8.1 miles, which could result in increased impacts on nesting and foraging locations. MM BIO-2 would apply to Alternative 3 and would reduce impacts to less than significant. Construction noise and activity impacts would be the same as described for Alternative 1. MM BIO-3 would apply to Alternative 3 and would reduce impacts to less than significant.

Operation and maintenance impacts on gull-billed tern and black skimmer would be the same as described for Alternative 1; however, the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of these species if the pump is located adjacent to breeding locations. MM BIO-2 and MM BIO-3 would apply to Alternative 3 and would reduce impacts to less than significant.

Loggerhead Shrike. Impacts on loggerhead shrikes would be the same as described for Alternative 1; however, impacts on potential breeding habitat would be reduced because the upstream diversion, conveyance pipelines, and sedimentation basins would not be built. Sedimentation basins would still be built but adjacent to the ponds in areas less likely to have potential breeding habitat for this species. This reduction would be at least partially offset by the increased amount of shoreline temporarily affected by construction activities. MM BIO-2 would apply to Alternative 3 and would reduce impacts to less than significant. Construction noise and activity would be the same as described for Alternative 1. MM BIO-3 would apply to Alternative 3 and would reduce impacts to less than significant.

Operation and maintenance impacts on loggerhead shrike would be the same as described for Alternative 1; however, the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of the species if the pump is located adjacent to breeding habitat. MM BIO-2 and MM BIO-3 would apply to Alternative 3 and would reduce impacts to less than significant.

Impact BIO-1b: Project construction and operation would have minor effects on habitat and individuals of several special-status species (less-than-significant or no impact).

Desert Pupfish. Effects of mosquito control activities would be less than significant as described for Alternative 1.

California Black Rail and Yuma Clapper Rail. Operation and maintenance impacts on the California black rail or Yuma clapper rail would be the same as described for Alternative 1. The low lift pump diversion at the SCH ponds would be located near the Sea's shoreline more than 1,000 feet from any freshwater marsh habitat. Thus, noise from this pump is not expected to exceed 60 dBA Leq at that habitat, and impacts of noise would be less than significant.

Other Nesting Marsh Bird Species. As described for the California black rail and Yuma clapper rail, impacts of an upstream diversion, conveyance pipelines, and sedimentation basin would not occur. Sedimentation basins would still be built but adjacent to the ponds and would be at least 1,000 feet away from existing marsh habitat. The low lift pump diversion at the SCH ponds would be located near the Sea's shoreline more than 1,000 feet from any freshwater marsh habitat. Thus, noise from this pump is not expected to exceed 60 dBA Leq at that habitat, and impacts of noise would be less than significant.

Mountain Plover, Lesser Sandhill Crane, Greater Sandhill Crane, American Peregrine Falcon, Bald Eagle, Wood Stork, Large-Billed Savannah Sparrow, Western Yellow Bat, and American Badger. Impacts on these species would be the same as described for Alternative 1; impacts would be less than significant.

Impact BIO-1c: Project operation would provide habitat for desert pupfish and several special-status bird species (beneficial impact). The SCH ponds would provide the same beneficial habitat effects for desert pupfish and special-status bird species as described for Alternative 1, but the area of the ponds would be 460 acres greater at approximately 3,770 acres.

Impact BIO-2: Project construction and operation would cause a temporary disturbance or loss of riparian habitat and/or sensitive habitat (significant impact). Potential losses of riparian habitat under Alternative 3 would be very similar to Alternative 2 (up to about 106 acres) because pond layout and divisions would be essentially the same, where they overlap with riparian habitat. These impacts would be significant.

As for Alternative 2, no impact would occur to mesquite bosque because it occurs outside the Project disturbance area.

Mitigation Measures

Mitigation Measure MM BIO-5 would apply to Alternative 2.

Residual Impact

Implementation of MM BIO-5 would reduce impacts to less than significant.

Impact BIO-3a: Project construction would result in temporary disturbance of Federal Waters of the U.S. and minimal effects on wetlands (less-than-significant impact). Temporary disturbance of Waters of the U.S. during construction of Alternative 3 would be more than under Alternative 1 (approximately 1,760 acres) because the aerial extent of the Sea that would be displaced by the ponds is more. As discussed under Alternative 1, although construction of berms and other facilities would result in a small loss of Waters of the U.S. (approximately 24 acres), an overall increase of 1,986 acres would occur. Similar to Alternative 1, operation and maintenance of the ponds and associated facilities would cause temporary disturbances to Waters of the U.S. at intervals during the Project life.

Effects on wetlands would be approximately the same as for Alternative 1. Impacts on wetlands and other Waters of the U.S. would be less than significant.

Implementation of MM BIO-4 would avoid less-than-significant impacts of the interception ditches on adjacent wetlands.

Impact BIO-3b: Project operation would increase the amount of Federal Waters of the U.S. (beneficial impact). Alternative 3 would result in a net increase in the extent of Waters of the U.S. of about 1,986 acres as compared to existing conditions, similar to Alternative 2. With the Sea's anticipated receding shoreline under the No Action Alternative, the amount would increase up to the entire pond area (minus berms and islands). As for Alternative 1, the Project is anticipated to also improve the quality of Waters of the U.S. within the area occupied by the SCH ponds, and overall impacts would be beneficial.

Impact BIO-4: Project construction and operation would not interfere with movement of fish and wildlife species, but construction could remove snags for colonial nesting birds (less-than-significant impact). The impact analysis for aquatic species in Impact BIO-4 of Alternative 1 would apply to Alternative 3, and impacts would be less than significant.

Impacts on colonial nesting birds would be less than significant as described for Alternative 2.

Implementation of MM BIO-5 would further reduce these less-than-significant impacts.

Impact BIO-5a: Project construction and operation could affect nesting by some common bird species and introduction of invasive species (significant impact). Construction impacts on common native wildlife species would be the same as described for Alternative 1; however, more existing agricultural drains within which common bird species could nest would be collected into the new interception ditch draining to the Salton Sea, which could result in greater impacts as in Alternative 2. In contrast, impacts on potential common bird nesting habitats would be reduced because no upstream diversion, conveyance pipelines, and sedimentation basins would be built. Construction of the sedimentation basins adjacent to the ponds would affect less common bird potential nesting habitat than at the upstream site. MM BIO-2 would apply to Alternative 3 and would reduce impacts to less than significant.

Operation and maintenance impacts on common native wildlife species would be as described for Alternative 1; however, a low lift pump diversion at the SCH ponds, which may have noise levels greater than 60 dBA Leq, could disrupt breeding of common bird species. MM BIO-2 and MM BIO-3 would apply to Alternative 3 and would reduce impacts to less than significant.

The potential for introduction of invasive species would be the same as described for Alternative 1. MM BIO-6 would apply to Alternative 3 and would reduce impacts to less than significant.

Impact BIO-5b: Project construction and operation would have minor effects on common fish (native and nonnative), wildlife species, and native plant communities (less-than-significant or no impact). No upland common native plant communities are present as described for Alternative 1, and no impacts would occur.

Effects of diversion entrainment, reduced river flow downstream of the diversion, and water quality fluctuations in the SCH ponds on aquatic biota and temporary disturbance of shallow shoreline and terrestrial habitat on birds and terrestrial wildlife would be the same as described under Alternative 1, and impacts would be less than significant when compared to the existing environmental setting and the No Action Alternative. Operation of pump stations and sedimentation basins would have effects similar to those described for Alternative 1, but the sedimentation basins would total 70 acres (10 more than for Alternative 1). Effects of selenium uptake, pesticides (Table 3.4-5), and avian diseases on common bird species would be essentially the same as described for Alternative 1. Impacts would be less than significant.

Impact BIO-5c: Project construction and operation would benefit common fish (native and nonnative) and wildlife species (beneficial impact). The beneficial effects of the ponds for aquatic species would be the same as for Alternative 1 except that a little more pond habitat (approximately 640 acres) would be present.

3.4.4.7 Alternative 4 – Alamo River, Gravity Diversion + Cascading Pond

Impact BIO-1a: Project construction and operation would affect habitat and individuals of desert pupfish and several special-status bird species (significant impact).

Desert Pupfish. Impacts on desert pupfish would be the same as described for Alternative 1, except that the amount of shallow shoreline isolated would be approximately 2.6 miles adjacent to the northern side of the Alamo River (excluding inside Morton Bay). Fewer existing agricultural drains would be collected in a single interception ditch. MM BIO-1 would apply to Alternative 4 and would reduce impacts to less than significant.

Burrowing Owl. Impacts of construction activities on burrowing owls would be the same as described for Alternative 1 but near the Alamo River and adjacent to Red Hill for the pump station and pipeline for saline water. Fewer agricultural drains within which burrowing owls could nest would be collected in a single interception ditch. MM BIO-2 would apply to Alternative 4 and would reduce impacts to less than significant. Construction noise and activity impacts would be the same as described for Alternative 1 but also include the pump station at Red Hill. MM BIO-3 would apply to Alternative 4 and would reduce impacts to less than significant. Operation and maintenance impacts on burrowing owls would be the same as described for Alternative 1 but include noise from the pump station. MM BIO-3 would apply to Alternative 4 and would reduce impacts to less than significant.

California Black Rail and Yuma Clapper Rail. Construction impacts on California black rail and Yuma clapper rail would be the same as described for Alternative 1; however, fewer drains within which freshwater marsh habitat may be present for nesting of the California black rail or Yuma clapper rail could be affected. Large patches of suitable habitat in Sonny Bono NWR are adjacent to the SCH Project, and individual rails present in that habitat could be affected by construction noise. MM BIO-2 and MM BIO-3 would apply to Alternative 4 and would reduce impacts to less than significant.

Operation and maintenance impacts on California black rail or Yuma clapper rail would be the same as described for Alternative 1, but the interception ditch could affect marsh habitat adjacent to Wister Beach. In addition, noise from operation and maintenance of Project components, primarily the river water and saline water conveyance pipelines, located adjacent to areas in Sonny Bono NWR that may contain suitable habitat for the species could also affect these species. MM BIO-2, MM BIO-3, and MM BIO-4 would apply to Alternative 4 and would reduce impacts to less than significant.

Other Nesting Marsh Bird Species. Construction impacts on redhead, least bittern, and yellow-headed blackbird would be the same as described for Alternative 1; however, fewer drains within which freshwater marsh habitat may be present for nesting of these species would be affected. Large patches of suitable habitat in Sonny Bono NWR are adjacent to the Project area, and any marsh birds nesting in that habitat could be affected by construction noise. MM BIO-2 and MM BIO-3 would apply to Alternative 4 and would reduce impacts to less than significant.

Operation and maintenance impacts on redhead, least bittern, and yellow-headed blackbird would be the same as described for Alternative 1 but at marshes near the Alamo River and Wister Beach. Noise impacts from operation and maintenance of Project components located adjacent to areas that may contain suitable habitat for the species could also occur. MM BIO-2, MM BIO-3, and MM BIO-4 would apply to Alternative 4 and would reduce impacts to less than significant.

Western Snowy Plover. Construction and operation impacts on western snowy plover would be the same as described for Alternative 1, but the amount of shoreline and shallow shoreline disturbed or lost would decrease to 2.6 miles. Some areas of shallow shoreline within Morton Bay would also be lost due to increased water surface elevation compared to existing conditions. MM BIO-2 would apply to Alternative 4 and would reduce impacts to less than significant. Construction and operation noise and activity effects would be the same as described for Alternative 1. MM BIO-3 would apply to Alternative 4 and would reduce impacts to less than significant.

Riparian Bird Species. Construction impacts on white-tailed kite, little willow flycatcher, yellow-breasted chat, gila woodpecker, and crissal thrasher would be the same as described for Alternative 1, but slightly less habitat could be affected (see Impact BIO-2). MM BIO-2 and MM BIO-3 would apply to Alternative 4 and would reduce impacts to less than significant.

Operation and maintenance impacts on white-tailed kite, little willow flycatcher, yellow-breasted chat, gila woodpecker, and crissal thrasher would be the same as described for Alternative 1. MM BIO-3 would apply to Alternative 4 and would reduce impacts to less than significant.

Gull-Billed Tern and Black Skimmer. Construction impacts on gull-billed terns and black skimmers would be the same as described for Alternative 1, but, although the amount of shoreline and shallow shoreline along the Sea temporarily disturbed would decrease to 2.6 miles (excluding shoreline of Morton Bay), these species have nested along Morton Bay’s shoreline, which could result in increased impacts on nesting locations. MM BIO-2 and MM BIO-3 would apply to Alternative 4 and would reduce impacts to less than significant.

Operation and maintenance impacts on gull-billed terns and black skimmers would be the same as described for Alternative 1. MM BIO-3 would apply to Alternative 4 and would reduce impacts to less than significant.

Loggerhead Shrike. Construction impacts on loggerhead shrike would be the same as described for Alternative 1. In addition, the species could also occur on Red Hill near the pump station location. MM BIO-2 and MM BIO-3 would apply to Alternative 4 and would reduce impacts to less than significant.

Operation and maintenance impacts on loggerhead shrike would be the same as described for Alternative 1, although noise from the pump station next to Red Hill could affect nesting if sound levels exceeding 60 dBA were present in nesting habitat. MM BIO-3 would apply to Alternative 4 and would reduce impacts to less than significant.

Impact BIO-1b: Project construction and operation would have minor effects on habitat and individuals of several special-status species (less-than-significant or no impact).

Desert Pupfish. Effects of mosquito control activities would be less than significant as described for Alternative 1.

California Black Rail, Yuma Clapper Rail, and Other Nesting Marsh Bird Species. Operation and maintenance impacts on the California black rail or Yuma clapper rail and nesting marsh birds would be the same as described for Alternative 1, less than significant.

Western Snowy Plover. Operation and maintenance of the pump station to bring saline water to the ponds is unlikely to disrupt breeding of the western snowy plover because little to no suitable nesting habitat is present at that location. Impacts would be less than significant.

Riparian Bird Species. Impacts of operation and maintenance of the pump station for saline water would be the same as described for Alternative 1, except near the Alamo River. No impacts would occur as no nesting habitat is present at that location.

Gull-Billed Tern and Black Skimmer. Construction impacts would be the same as described for Alternative 1, less than significant.

Loggerhead Shrike. Impacts of operation and maintenance activities for the ponds would be the same as described for Alternative 1, less than significant.

Mountain Plover, Lesser Sandhill Crane, Greater Sandhill Crane, American Peregrine Falcon, Bald Eagle, Wood Stork, Large-Billed Savannah Sparrow, Western Yellow Bat, and American Badger. Impacts of construction, operation, and maintenance on these species would be the same as described for Alternative 1; impacts would be less than significant.

Impact BIO-1c: Project operation would provide habitat for desert pupfish and several special-status bird species (beneficial impact). The SCH ponds would provide the same type of beneficial habitat effects for desert pupfish and special-status bird species as described for Alternative 1, but the area of the ponds (2,290 acres) would be approximately 840 acres less.

Impact BIO-2: Project construction and operation would cause a temporary disturbance or loss of riparian habitat and/or sensitive habitat (significant impact). Potential losses of riparian habitat under Alternative 4 would be less than for Alternative 1 because the amount of riparian habitat that could be removed to construct the ponds would be less. Somewhat more naturally occurring riparian habitat is present along the Alamo River, where the diversion would likely be constructed, than at the New River. However, that is a relatively small proportion of the riparian area that could be disturbed.

In addition to impacts on riparian habitat, mesquite bosque could be impacted where it has been planted at the northern end of Hatfield Road in the IWA. Hence, impacts on riparian vegetation and mesquite bosque could be about the same or slightly less than for Alternative 1, and would be considered a significant impact when compared to the existing environmental setting and the No Action Alternative.

Mitigation Measures

MM BIO-5 would apply to Alternative 4.

Residual Impact

Implementation of MM BIO-5 would reduce impacts to less than significant.

Impact BIO-3a: Project construction would result in temporary disturbance of Federal Waters of the U.S. and minimal effects on wetlands (less-than-significant impact). Temporary disturbance of Waters of the U.S. under Alternative 4 would be substantially less than for Alternative 1 (approximately 980 acres) because the aerial extent of the Sea that would be displaced by the ponds is much less. As discussed under Alternative 1, although construction of berms and other facilities would result in a small loss of Waters of the U.S. (approximately 10 acres), the Project would have a net increase in Waters of the U.S. of 1,300 acres (see Impact BIO-3b). Similar to Alternative 1, operation and maintenance of the ponds and associated facilities would cause temporary disturbances to Waters of the U.S. at intervals during the Project life.

Effects on wetlands would be approximately the same as for Alternative 1. Impacts on wetlands and other Waters of the U.S. would be less than significant.

Implementation of MM BIO-4 would avoid the less-than-significant impacts of the interception ditches on wetlands.

Impact BIO-3b: Project operation would increase the amount of Federal Waters of the U.S. (beneficial impact). Compared to existing conditions, Alternative 4 would result in a net increase in the extent of Waters of the U.S. of about 1,300 acres, less than for Alternative 1. With the Sea's anticipated receding shoreline under the No Action Alternative, the amount would increase up to the entire pond area (minus berms and islands). As for Alternative 1, the Project is anticipated to also improve the quality of Waters of the U.S. within the area occupied by the SCH ponds compared to existing environmental conditions and the No Action Alternative, and overall impacts would be beneficial.

Impact BIO-4: Project construction and operation would not interfere with movement of fish and wildlife species, but construction could remove snags for colonial nesting birds (less-than-significant impact). The impact analysis for aquatic species in Impact BIO-4 of Alternative 1 would apply to Alternative 4, but the effects would be adjacent to or in the Alamo River, and impacts would be less than significant.

The less-than-significant impacts on colonial nesting birds would be essentially the same as described for Alternative 1 but at the Alamo River. However, the saline water pump station would be on land and not isolated but could still be used by birds for nesting or roosting.

Implementation of MM BIO-5 would further reduce the less-than-significant impacts on nesting birds.

Impact BIO-5a: Project construction and operation could affect nesting by some common bird species and introduction of invasive species (significant impact). Construction impacts on nesting by common bird species would be the same as described for Alternative 1. MM BIO-2 and MM BIO-3 would apply to Alternative 4 and would reduce impacts to less than significant.

Operation and maintenance impacts on nesting by common bird species would be the same as described for Alternative 1, but at the Alamo River. MM BIO-2 and MM BIO-3 would apply to Alternative 4 and would reduce impacts to less than significant.

The potential for introduction of invasive species would be the same as described for Alternative 1. MM BIO-6 would apply to Alternative 4 and would reduce impacts to less than significant.

Impact BIO-5b: Project construction and operation would have minor effects on common fish (native and nonnative), wildlife species, and native plant communities (less-than-significant impact). Common native plant communities in the Project area are very limited in extent and include two types of saltbush scrub: desert holly scrub and quailbush scrub at Red Hill. Due to the abundance of these plant communities in the Project region and the very limited extent in the Project area, disturbance or loss of small amounts of these plant communities would be a less-than-significant impact when compared to the existing environmental setting and the No Action Alternative.

Effects of diversion entrainment, reduced river flow downstream of the diversion, and water quality fluctuations in the SCH ponds on aquatic biota would be the same as described under Alternative 1, except that the effects would be at the Alamo River, and impacts would be less than significant. Project effects on shallow shoreline habitat and common terrestrial wildlife would be less than significant as described for Alternative 1. Operation of the pump station and sedimentation basin would have effects similar to those described for Alternative 1, except the sedimentation basin would be 37 acres (23 acres less than for Alternative 1).

Effects of selenium uptake, pesticides, and avian diseases on common bird species would be essentially the same as described for Alternative 1, although the risk of selenium uptake would be slightly higher due to the higher selenium concentration in Alamo River water than in New River water. Ecorisk modeling was used to predict potential selenium concentrations in water and biota for different Project alternatives and operations (river water blended with Salton Sea water to achieve 20 ppt or 35 ppt salinity in ponds) (Sickman et al. 2011, see Appendix I). For Alternative 4, predicted egg selenium concentrations would be 8.9 µg/g dw for ponds operated at 35 ppt, and 12.7 µg/g dw for ponds operated at 20 ppt. This amount exceeds the conservative toxicity threshold (>6.0 µg/g dw), which would increase the probability of reduced hatching success in some sensitive species, and approaches levels associated with teratogenesis in sensitive species (>12 µg/g dw). However, overall impacts on breeding birds using the SCH ponds would be less than significant for the reasons described under Alternative 1.

DDE exposure would be higher for Alternative 4 than Alternatives 1 to 3 due to the higher DDE concentrations measured in sediments near the Alamo River compared to the New River. The estimated DDE concentration of pond sediments for Alternative 4 compared to existing and No Project conditions showed an increase of 2.0 ng/g for estimates based on mean existing DDE concentrations and an increase of 12.6 ng/g for estimates using only the highest observed DDE concentration (Table 3.4-5). Existing maximum sediment DDE concentration exceeded the PEC concentration of 31.3 ng/g, as did the Alternative 4 maximum calculated estimate using the highest observed concentration. Impacts of DDE exposure from the Project would be less than significant when compared to the existing environmental setting and the No Action Alternative.

Impact BIO-5c: Project construction and operation would benefit common fish (native and nonnative) and wildlife species (beneficial impact). The beneficial effects of the ponds for aquatic species would be the same as for Alternative 1 except near the Alamo River and less pond habitat (approximately 840 acres less) would be present.

3.4.4.8 Alternative 5 – Alamo River, Pumped Diversion

Impact BIO-1a: Project construction and operation would affect habitat and individuals of desert pupfish and several special-status bird species (significant impact).

Desert Pupfish. Impacts on desert pupfish would be the same as described for Alternative 1, except that the amount of shallow shoreline along the Sea isolated would be 4.1 miles adjacent to the Alamo River (excluding Morton Bay). MM BIO-1 would apply to Alternative 5 and would reduce impacts to less than significant.

Burrowing Owl. Construction impacts on burrowing owls would be the same as described for Alternative 1, but near the Alamo River. However, fewer existing agricultural drains within which burrowing owl could nest or winter would be collected into the new interception ditch, which could result in less potential for impacts than for Alternative 1 and the same as for Alternative 4. As described for Alternative 2, the potential for impacts on burrowing owl habitat and nesting and wintering burrows would be reduced because no upstream diversion structure, conveyance pipelines, and sedimentation basins would be constructed. MM BIO-2 and MM BIO-3 would apply to Alternative 5 and would reduce impacts to less than significant. Operation and maintenance impacts on burrowing owls would be the same as described for Alternative 1; however, the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of burrowing owls if burrows are present within the 60-dBA noise contour. MM BIO-2 and MM BIO-3 would apply to Alternative 5 and would reduce impacts to less than significant.

California Black Rail and Yuma Clapper Rail. Construction impacts on the California black rail and Yuma clapper rail would be the same as described for Alternative 4. The potential for impacts on occupied freshwater marsh habitat would be reduced because no diversion structure, conveyance pipelines, and sedimentation basins would be constructed upstream along the Alamo River. Although construction of the northern pond along Wister Beach would be greater than 500 feet from known Yuma clapper rail observation locations, freshwater marsh is present less than 500 feet from the Project, and rails could use that habitat, which would increase the potential for noise impacts on these species. MM BIO-2 and MM BIO-3 would apply to Alternative 4 and would reduce impacts to less than significant.

Operation and maintenance impacts during drain interception ditch maintenance on California black rail or Yuma clapper rail would be the same as described for Alternative 1, but the interception ditch could affect marsh habitat adjacent to Wister Beach. MM BIO-2, MM BIO-3, and MM BIO-4 would apply to Alternative 5 and would reduce impacts to less than significant.

Other Nesting Marsh Bird Species. Construction impacts on redhead, least bittern, and yellow-headed blackbird would be the same as described for Alternatives 1 and 4. Compared to Alternative 4, the potential for impacts on occupied freshwater marsh habitat would be reduced because no upstream diversion structure, conveyance pipelines, and sedimentation basins would be built. Maintenance of the drain interception ditch would have the potential to affect breeding marsh birds as described for Alternative 1. MM BIO-2, MM BIO-3, and MM BIO-4 would apply to Alternative 4 and would reduce impacts to less than significant.

Western Snowy Plover. Construction impacts on western snowy plover would be the same as described for Alternative 1, but the amount of shoreline and shallow shoreline along the Sea disturbed or lost would decrease to 4.1 miles (excluding Morton Bay). MM BIO-2 and MM BIO-3 would apply to Alternative 5 and would reduce impacts to less than significant.

Operation of the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of the species if the pump is located adjacent to breeding habitat. MM BIO-2 and MM BIO-3 would apply to Alternative 5 and would reduce impacts to less than significant.

Riparian Bird Species. Construction impacts on white-tailed kite, little willow flycatcher, yellow-breasted chat, gila woodpecker, and crissal thrasher would be the same as described for Alternatives 1 and 4; impacts on riparian habitat would be approximately the same even with no upstream diversion structure, sedimentation basin, and conveyance pipelines in Alternative 5. MM BIO-2 and MM BIO-3 would apply to Alternative 5 and would reduce impacts to less than significant.

Operation and maintenance impacts on white-tailed kite, little willow flycatcher, yellow-breasted chat, gila woodpecker, and crissal thrasher would be the same as described for Alternatives 1 and 4; however, the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq that could disrupt breeding of these species in the adjacent riparian habitat along the Alamo River. MM BIO-2 and MM BIO-3 would apply to Alternative 5 and would reduce impacts to less than significant.

Gull-Billed Tern and Black Skimmer. Impacts on gull-billed tern and black skimmer would be the same as described for Alternative 4, but the amount of shoreline and shallow shoreline temporarily disturbed would increase to 4.1 miles (excluding the shoreline of Morton Bay), which could result in increased impacts on nesting and foraging locations. In addition, these species have nested along Morton Bay's shoreline; hence, increased impacts on nesting locations could occur. MM BIO-2 and MM BIO-3 would apply to Alternative 5 and would reduce impacts to less than significant.

Operation and maintenance impacts on the gull-billed tern and black skimmer would be the same as described for Alternative 4; however, the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of these species if the pump is located adjacent to breeding locations. MM BIO-2 and MM BIO-3 would apply to Alternative 5 and would reduce impacts to less than significant.

Loggerhead Shrike. Construction impacts on loggerhead shrikes would be the same as described for Alternative 1; however, impacts on potential breeding habitat would be reduced because construction of the upstream diversion structure, sedimentation basin, and conveyance pipelines would not occur. A sedimentation basin would still be built but adjacent to the ponds in an area less likely to have potential breeding habitat for this species. MM BIO-2 and MM BIO-3 would apply to Alternative 5 and would reduce impacts to less than significant.

Operation and maintenance impacts on loggerhead shrike would be the same as described for Alternative 1; however, the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of the species if the pump is located adjacent to breeding habitat. MM BIO-2 and MM BIO-3 would apply to Alternative 5 and would reduce impacts to less than significant.

Impact BIO-1b: Project construction and operation would have minor effects on habitat and individuals of several special-status species (less-than-significant impact).

Desert Pupfish. Effects of mosquito control activities would be less than significant as described for Alternative 1.

California Black Rail and Yuma Clapper Rail. The low lift pump diversion at the SCH ponds would be at least 750 feet away from suitable habitat within Sonny Bono NWR and noise levels greater than 60 dBA Leq would not be expected at those habitats. Impacts would be less than significant.

Other Nesting Marsh Birds. Operation and maintenance of the saline water pump station would have no impacts on nesting marsh birds because no nesting habitat is nearby. Operation and maintenance of the diversion pump station would have less-than-significant impacts on marsh bird nesting due to the distance of nesting habitat from this facility.

Mountain Plover, Lesser Sandhill Crane, Greater Sandhill Crane, American Peregrine Falcon, Bald Eagle, Wood Stork, Large-Billed Savannah Sparrow, Western Yellow Bat, and American Badger. Impacts on these species would be the same as described for Alternative 4; impacts would be less than significant.

Impact BIO-1c: Project operation would provide habitat for desert pupfish and several special-status bird species (beneficial impact). The SCH ponds would provide the same beneficial effects for desert pupfish and special-status bird species as described for Alternative 1, but the area of the ponds would be less (about 420 acres) at approximately 2,080 acres.

Impact BIO-2: Project construction and operation would cause a temporary disturbance or loss of riparian habitat and/or sensitive habitat (significant impact). Potential losses of riparian habitat under

Alternative 5 would be approximately the same as for Alternative 1 (up to about 90 acres) because the amount of riparian habitat that could be removed to construct the ponds would be about the same.

No impacts on mesquite bosque would occur because it is not present within the Project footprint.

Impacts on riparian vegetation would be about the same as for Alternative 1 and would be considered a significant impact when compared to the existing environmental setting and the No Action Alternative. MM BIO-5 would apply to Alternative 5 and would reduce impacts to less than significant.

Impact BIO-3a: Project construction would result in temporary disturbance of Federal Waters of the U.S. and minimal effects on wetlands (less-than-significant impact). Temporary disturbance of Waters of the U.S. under Alternative 5 would be about half that under Alternative 1 (approximately 840 acres) because the aerial extent of the Sea that would be displaced by the ponds is much less. As discussed under Alternative 1, although construction of berms and other facilities would result in a small loss of Waters of the U.S. (approximately 8 acres), the Project would have a net increase in Waters of the U.S. of 1,232 acres (see Impact BIO-3b). Similar to Alternative 1, operation and maintenance of the ponds and associated facilities would cause temporary disturbances to Waters of the U.S. at intervals during the Project life.

Effects on wetlands would be approximately the same as for Alternative 1. Impacts on wetlands and other Waters of the U.S. would be less than significant.

Implementation of MM BIO-4 would avoid the less-than-significant impacts of the interception ditches.

Impact BIO-3b: Project operation would increase the amount of Federal Waters of the U.S. (beneficial impact). Compared to existing conditions, Alternative 5 would result in a net increase in the extent of Waters of the U.S. of about 1,232 acres, less than for Alternative 1. With the Sea's anticipated receding shoreline under the No Action Alternative, the amount would increase up to the entire pond area (minus berms and islands). As for Alternative 1, the Project is anticipated to also improve the quality of Waters of the U.S. within the area occupied by the SCH ponds compared to existing environmental conditions and the No Action Alternative, and overall impacts would be beneficial.

Impact BIO-4: Project construction and operation would not interfere with movement of fish and wildlife species, but construction could remove snags for colonial nesting birds (less-than-significant impact). The impact analysis for aquatic species in Alternative 1 would apply to Alternative 5, but the effects would be adjacent to or in the Alamo River, and impacts would be less than significant.

Impacts on colonial nesting birds would be the same as described for Alternative 1, including impacts on riparian vegetation.

Implementation of MM BIO-5 would further reduce the less-than-significant impacts on colonial nesting birds.

Impact BIO-5a: Project construction and operation could affect nesting by some common bird species and introduction of invasive species (significant impact). Construction impacts on nesting by common bird species would be the same as described for Alternative 4. As described in Alternative 2, the potential for impacts on common bird nesting habitats would be reduced because no upstream diversion structure, conveyance pipelines, and sedimentation basins would be built, and the sedimentation basin adjacent to the ponds would be in an area with less potential nesting habitat. MM BIO-2 would apply to Alternative 4 and would reduce impacts to less than significant.

Operation and maintenance impacts on nesting by common bird species would be the same as described for Alternative 1; however, the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of common bird species. MM BIO-2 and MM BIO-3 would apply to Alternative 5 and would reduce impacts to less than significant.

The potential for introduction of invasive species would be the same as described for Alternative 1. MM BIO-6 would apply to Alternative 5 and would reduce impacts to less than significant.

Impact BIO-5b: Project construction and operation would have minor effects on common fish (native and nonnative), wildlife species, and native plant communities (less-than-significant impact). The analysis described for native plant communities in Alternative 4 would apply to Alternative 5, and impacts would be less than significant.

Effects of diversion entrainment, reduced river flow downstream of the diversion, and water quality fluctuations in the SCH ponds on aquatic biota would be the same as described under Alternative 1, except that the effects would be at the Alamo River, and impacts would be less than significant. Operation of the pump stations and sedimentation basin would have effects similar to those described for Alternative 1, except the sedimentation basin would be 30 acres (half of that for Alternative 1).

Effects of avian diseases on common bird species would be essentially the same as described for Alternative 1. Effects of selenium uptake would be the same as described for Alternative 4. Effects of pesticides, namely DDE, would be the same as described for Alternative 4 for estimates based on mean DDE concentrations (<1 to 5.5 ng/g increase), and somewhat higher for estimates based on a maximum DDE concentration (<1 to 34.2 ng/g increase). This increase was observed for the Alamo River - Morton Bay area (66.6 ng/g), where an extreme outlier sample skewed estimates higher. Sediment concentrations exceeded the PEC of 31.3 ng/g only for those estimates calculated with the maximum DDE concentration. Compared to existing conditions and the No Action Alternative, impacts would be less than significant. Project effects on shallow shoreline habitat and common terrestrial wildlife would be less than significant as described for Alternative 1.

Impact BIO-5c: Project construction would benefit common fish (native and nonnative) and wildlife species (beneficial impact). Beneficial effects of the ponds for aquatic species would be the same as described for Alternative 1 but near the Alamo River; less pond habitat (approximately 1,050 acres) would be present.

3.4.4.9 Alternative 6 – Alamo River, Pumped Diversion + Cascading Ponds

Alternative 6 would be similar to Alternative 5 with the addition of cascading ponds on the seaward side of the Alternative 5 ponds, resulting in a larger (860 acres) total pond area of 2,940 acres.

Impact BIO-1a: Project construction and operation would affect habitat and individuals of desert pupfish and several special-status bird species (significant impact).

Desert Pupfish. Impacts on desert pupfish would be the same as described for Alternative 1, except that the amount of shallow shoreline along the Sea isolated would be 4.1 miles adjacent to the Alamo River (excluding Morton Bay), and water from existing agricultural drains would be collected into one drain interception ditch to the Salton Sea as in Alternative 4. MM BIO-1 would apply to Alternative 6 and would reduce impacts to less than significant.

Burrowing Owl. Construction impacts on burrowing owls would be the same as described for Alternative 1, but near the Alamo River. However, fewer existing agricultural drains within which burrowing owl could nest or winter would be collected into a new drain interception ditch, which could result in less potential for impacts than for Alternative 1 and the same as for Alternative 4. As described for Alternative 2, the potential for impacts on burrowing owl habitat and nesting and wintering burrows would be reduced because no upstream diversion structure, conveyance pipelines, and sedimentation basins would be constructed. MM BIO-2 and MM BIO-3 would apply to Alternative 6 and would reduce impacts to less than significant. Operation and maintenance impacts on burrowing owls would be the same as described for Alternative 1; however, the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of burrowing owls if burrows are present within the 60-dBA noise contour. MM BIO-2 and MM BIO-3 would apply to Alternative 6 and would reduce impacts to less than significant.

California Black Rail and Yuma Clapper Rail. Construction impacts on the California black rail and Yuma clapper rail would be the same as described for Alternative 4. The potential for impacts on occupied freshwater marsh habitat would be reduced because no diversion structure, conveyance pipelines, and sedimentation basins would be constructed upstream along the Alamo River. MM BIO-2 and MM BIO-3 would apply to Alternative 6 and would reduce impacts to less than significant.

Operation and maintenance impacts during drain interception ditch maintenance on California black rail or Yuma clapper rail would be the same as described for Alternative 1, but the interception ditch could affect marsh habitat adjacent to Wister Beach. MM BIO-2, MM BIO-3, and MM BIO-4 would apply to Alternative 6 and would reduce impacts to less than significant.

Other Nesting Marsh Bird Species. Construction impacts on redhead, least bittern, and yellow-headed blackbird would be the same as described for Alternatives 1 and 4. Compared to Alternative 4, the potential for impacts on occupied freshwater marsh habitat would be reduced because no upstream diversion structure, conveyance pipelines, and sedimentation basins would be built. Maintenance of the drain interception ditch would have the potential to affect breeding marsh birds as described for Alternative 1. MM BIO-2, MM BIO-3, and MM BIO-4 would apply to Alternative 6 and would reduce impacts to less than significant.

Western Snowy Plover. Construction impacts on western snowy plover would be the same as described for Alternative 1, but the amount of shoreline and shallow shoreline along the Sea disturbed or lost would decrease to 4.1 miles (excluding Morton Bay). MM BIO-2 and MM BIO-3 would apply to Alternative 6 and would reduce impacts to less than significant.

Operation of the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of the species if the pump is located adjacent to breeding habitat. MM BIO-2 and MM BIO-3 would apply to Alternative 6 and would reduce impacts to less than significant.

Riparian Bird Species. Construction impacts on white-tailed kite, little willow flycatcher, yellow-breasted chat, gila woodpecker, and crissal thrasher would be the same as described for Alternatives 1 and 4; impacts on riparian habitat would be approximately the same as Alternative 1 even with no upstream diversion structure, sedimentation basin, and conveyance pipelines in Alternative 6 (see Impact BIO-2). MM BIO-2 and MM BIO-3 would apply to Alternative 6 and would reduce impacts to less than significant.

Operation and maintenance impacts on white-tailed kite, little willow flycatcher, yellow-breasted chat, gila woodpecker, and crissal thrasher would be the same as described for Alternatives 1 and 4; however, the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq that could disrupt breeding of these species in the adjacent riparian habitat along the Alamo River. MM BIO-2 and MM BIO-3 would apply to Alternative 6 and would reduce impacts to less than significant.

Gull-Billed Tern and Black Skimmer. Impacts on gull-billed tern and black skimmer would be the same as described for Alternative 4, but the amount of shoreline and shallow shoreline temporarily disturbed would increase to 4.1 miles (excluding Morton Bay), which could result in increased impacts on nesting and foraging locations. In addition, these species have nested along Morton Bay's shoreline; hence, increased impacts on nesting locations could occur. MM BIO-2 and MM BIO-3 would apply to Alternative 6 and would reduce impacts to less than significant.

Operation and maintenance impacts on the gull-billed tern and black skimmer would be the same as described for Alternative 4; however, the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of these species if the pump is located adjacent to breeding locations. MM BIO-2 and MM BIO-3 would apply to Alternative 6 and would reduce impacts to less than significant.

Loggerhead Shrike. Construction impacts on loggerhead shrikes would be the same as described for Alternative 1; however, impacts on potential breeding habitat would be reduced because construction of the upstream diversion structure, sedimentation basin, and conveyance pipelines would not occur. A sedimentation basin would still be built but adjacent to the ponds in an area less likely to have potential breeding habitat for this species. MM BIO-2 and MM BIO-3 would apply to Alternative 6 and would reduce impacts to less than significant.

Operation and maintenance impacts on loggerhead shrike would be the same as described for Alternative 1; however, the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of the species if the pump is located adjacent to breeding habitat. MM BIO-2 and MM BIO-3 would apply to Alternative 6 and would reduce impacts to less than significant.

Impact BIO-1b: Project construction and operation would have minor effects on habitat for desert pupfish and several special-status species (less-than-significant impact).

Desert Pupfish. Effects of mosquito control activities would be less than significant as described for Alternative 1.

California Black Rail and Yuma Clapper Rail. The low lift pump diversion at the SCH ponds would be at least 750 feet away from suitable habitat within Sonny Bono NWR and noise levels greater than 60 dBA Leq would not be expected at those habitats. Impacts would be less than significant.

Other Nesting Marsh Birds. Operation and maintenance of the diversion pump station would have less-than-significant impacts on marsh bird nesting due to the distance of nesting habitat from this facility.

Mountain Plover, Lesser Sandhill Crane, Greater Sandhill Crane, American Peregrine Falcon, Bald Eagle, Wood Stork, Large-Billed Savannah Sparrow, Western Yellow Bat, and American Badger. Impacts on these species would be the same as described for Alternative 4; impacts would be less than significant.

Impact BIO-1c: Project operation would provide habitat for desert pupfish and several special-status bird species (beneficial impact). The SCH ponds would provide the same beneficial effects for desert pupfish and special-status bird species as described for Alternative 1, but the area of the ponds would be slightly less (190 acres) at approximately 2,940 acres.

Impact BIO-2: Project construction and operation would cause a temporary disturbance or loss of riparian habitat and/or sensitive habitat (significant impact). Potential losses of riparian habitat under Alternative 6 would be slightly less than for Alternative 1 (up to about 70 acres) due to relatively minor deviations in the amount of shoreline scrub habitat that would be removed.

No impacts on mesquite bosque would occur, because it is not present within the Project footprint.

Impacts on riparian vegetation would be about the same as for Alternative 1 and would be considered a significant impact when compared to the existing environmental setting and the No Action Alternative. MM BIO-5 would apply to Alternative 6 and would reduce impacts to less than significant.

Impact BIO-3a: Project construction would result in temporary disturbance of Federal Waters of the U.S. and minimal effects on wetlands (less-than-significant impact). Temporary disturbance of Waters of the U.S. under Alternative 6 would be slightly less (5 acres) than under Alternative 1 (approximately 1,330 acres) because the aerial extent of the Sea that would be displaced by the ponds is less. As discussed under Alternative 1, although construction of berms and other facilities would result in small losses of Waters of the U.S. (approximately 16 acres), but the Project would have a net increase of 1,360 acres (see Impact BIO-3b). Similar to Alternative 1, operation and maintenance of the ponds and associated facilities would cause temporary disturbances to Waters of the U.S. at intervals during the Project life.

Effects on wetlands would be approximately the same as for Alternative 1. Impacts on wetlands and other Waters of the U.S. would be less than significant.

Implementation of MM BIO-4 would avoid the less-than-significant impacts of the interception ditch on adjacent wetlands.

Impact BIO-3b: Project operation would increase the amount of Federal Waters of the U.S. (beneficial impact). Compared to existing conditions, Alternative 6 would result in a net increase in the extent of Waters of the U.S. of about 1,360 acres, less than for Alternative 1. With the Sea's anticipated receding shoreline under the No Action Alternative, the amount would increase up to the entire pond area (minus berms and islands). As for Alternative 1, the Project is anticipated to also improve the quality of Waters of the U.S. within the area occupied by the SCH ponds compared to existing environmental conditions and the No Action Alternative, and overall impacts would be beneficial.

Impact BIO-4: Project construction and operation would not interfere with movement of fish and wildlife species, but construction could remove snags for colonial nesting birds (less-than-significant impact). The impact analysis for aquatic species in Alternative 1 would apply to Alternative 6, but the effects would be adjacent to or in the Alamo River, and impacts would be less than significant.

Impacts on colonial nesting birds would be the same as described for Alternative 1, including impacts on riparian vegetation.

Implementation of MM BIO-5 would further reduce these less-than-significant impacts.

Impact BIO-5a: Project construction and operation could affect nesting by some common bird species and introduction of invasive species (significant impact). Construction impacts on nesting by common bird species would be the same as described for Alternative 1. However, fewer drains within which common bird species could nest would be combined, which could result in fewer impacts than for Alternative 1. As described in Alternative 2, the potential for impacts on common bird nesting habitats would be reduced because no upstream diversion structure, conveyance pipelines, and sedimentation basins would be built, and the sedimentation basin adjacent to the ponds would be in an area with less potential nesting habitat. MM BIO-2 would apply to Alternative 6 and would reduce impacts to less than significant.

Operation and maintenance impacts on nesting by common bird species would be the same as described for Alternative 1; however, the low lift pump diversion at the SCH ponds may have noise levels greater than 60 dBA Leq and could disrupt breeding of common bird species. MM BIO-2 and MM BIO-3 would apply to Alternative 6 and would reduce impacts to less than significant.

The potential for introduction of invasive species would be the same as described for Alternative 1. MM BIO-6 would apply to Alternative 6 and would reduce impacts to less than significant.

Impact BIO-5b: Project construction and operation would have minor effects on common, fish (native and nonnative), wildlife species, and native plant communities (less-than-significant impact). The analysis described for native plant communities in Alternative 4 would apply to Alternative 6, and impacts would be less than significant.

Effects of diversion entrainment, reduced river flow downstream of the diversion, and water quality fluctuations in the SCH ponds on aquatic biota would be the same as described under Alternative 1, except that the effects would be at the Alamo River, and impacts would be less than significant. Operation of the pump stations and sedimentation basin would have effects similar to those described for Alternative 1, except the sedimentation basin would be 50 acres (10 less than for Alternative 1).

Effects of avian diseases on common bird species would be essentially the same as described for Alternative 1. Effects of selenium uptake would be the same as described for Alternative 4, while effects of pesticides would be essentially the same as described for Alternative 5. Impacts would be less than significant. Project effects on shallow shoreline habitat and common terrestrial wildlife would be less than significant as described for Alternative 1.

Impact BIO-5c: Project construction would benefit common fish (native and nonnative) and wildlife species (beneficial impact). The beneficial effects of the ponds for aquatic species would be the same as described for Alternative 1 but near the Alamo River, and slightly less pond habitat (approximately 190 acres) would be present.

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